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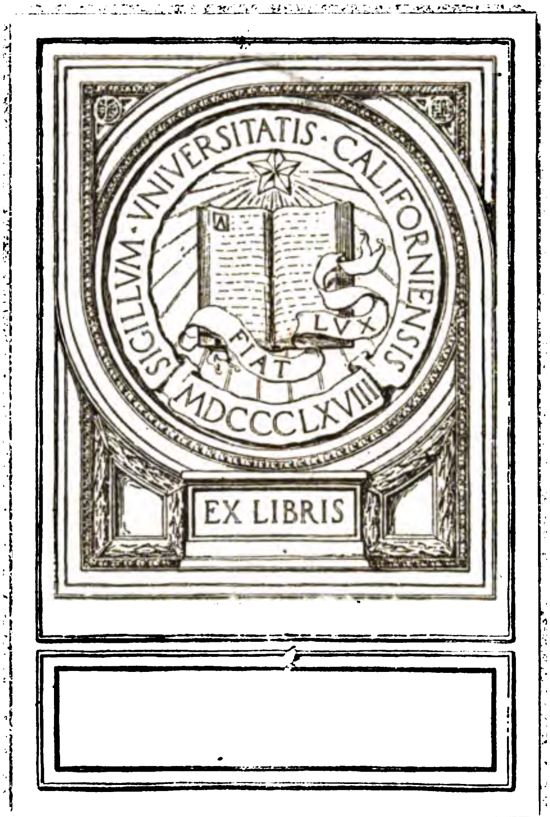
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UNIV. OF CALIFORNIA

Ideal Rig Irons and Parts

Standard Rig Irons and Parts

Rig Iron Specifications

Smith and Hess Iron Pitmans

Smith and Hess Trusses

Sand Reels and Parts

Steel Crown Blocks

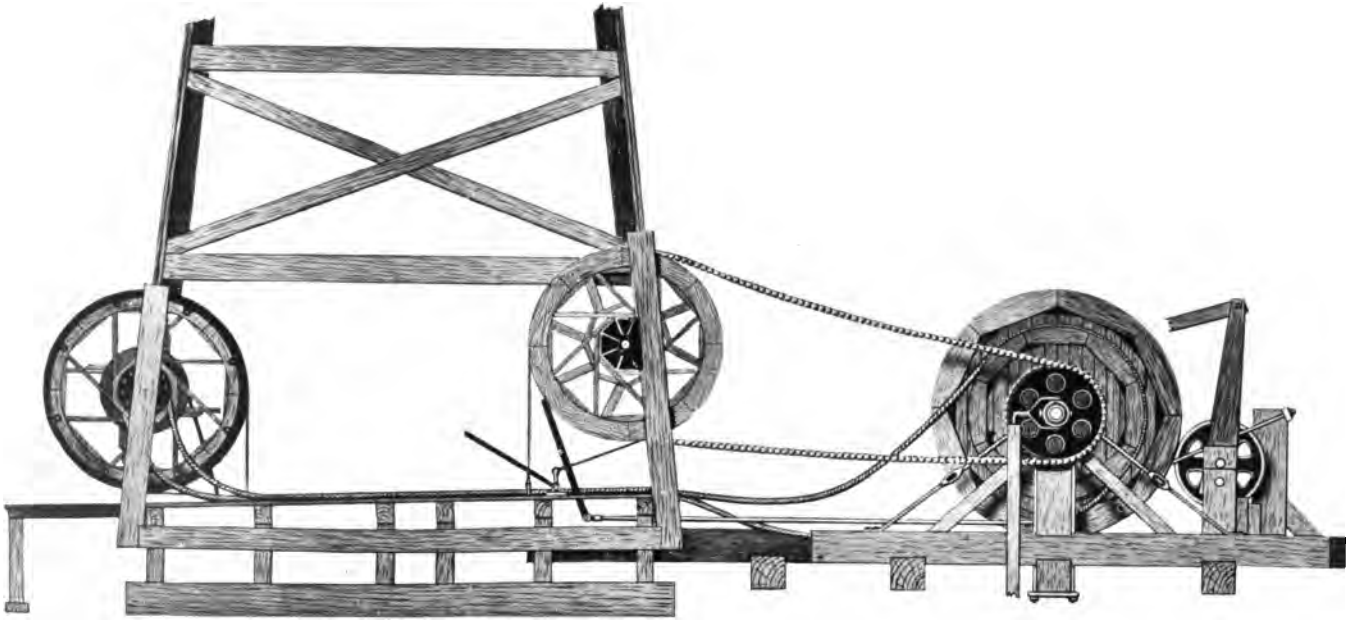
Ideal Calf Wheels

Ross and Seeley Iron Bull
and Calf Wheel Shafts

Pages 1 to 24 Inclusive

UNIV. OF CALIFORNIA

Ideal Rig Irons



SKETCH SHOWING IDEAL CLUTCH SPROCKET ATTACHMENT

Fig. 1

Ideal Rig

TIMBER AND LUMBER REQUIRED TO BUILD A COMPLETE RIG
DERRICK 82 FEET HIGH WITH BASE 20 FEET SQUARE

Pieces	Size, Inches	Length, Feet	OREGON PINE	Feet
1	14x14x14x30	26	Walking beam	910
1	22x24	9	Engine block	396
1	16x16	30	Main sill	640
1	16x16	20	Sub sill	427
1	16x16	16	Sampson post	341
1	16x16	14	Bull wheel shaft	299
4	14x14	16	Mud sills	1045
1	14x14	16	Tail sill and post	261
1	14x14	12	Nose sill	196
2	14x14	16	Engine mud sills	523
2	14x14	14	Casing sills	457
1	16x16	14	Jack post	299
1	12x12	20	Back brake and blocking	240
1	12x12	24	Bull wheel post	288
1	12x12	24	Calf wheel post	288
1	12x12	14	Bumper	168
2	14x14	12	Pony sills	392
2	8x 8	22	Side sills	235
11	8x 8	20	Derrick sills and blocking	1173
1	8x 8	26	Bunting pole	139
2	6x 6	20	Dead men	120
2	6x 6	18	Jack post braces	108
1	6x 6	16	Calf wheel post braces	48
5	6x 6	14	Back brake, headache post, Sampson post and bull wheel braces	210
5	4x 6	16	Calf wheel and short braces	160
2	6x16	16	Crown block	256
1	5x16	12	Knuckle post	80
1	6x6x6x16	12	Pitman	96
1	5x5x5x14	12	Swing lever	70
1	14x14	20	Blocking	327
14	2x12	20	Band wheel centers (S.1.S.)	560
54	2x12	20	Derrick floor, walk and girts	2160
8	2x12	18	Derrick foundation and girts	288
8	2x12	16	Girts and top of derrick	256
4	2x12	14	Girts	112
6	2x10	26	Starting legs and belt house sills	260
4	2x10	18	Starting legs	120
28	2x12	24	Doublers	1344
48	2x10	16	Derrick legs	1280
12	2x 8	18	Derrick roof, forge and belt house	288
1	2x 8	24	Bunting pole to jack post	32
5	2x 6	26	Belt house frame	130
17	2x 6	20	Braces	340
8	2x 6	18	Braces	144
12	2x 6	16	Braces to cut	192
2	2x 6	14	Engine house frame	28
3	2x 6	12	Engine house frame	36
3	2x 4	14	Engine house frame	28
3	2x 4	12	Engine house frame	24
20	2x 4	16	Ladders	213
30	1x12	20	Siding	600
75	1x12	18	Siding	1350
146	1x12	16	Girts and siding	2336
50	1x12	14	Engine house siding and derrick roof	700
60	1x12	12	Siding	720
60	1x 6	16	Braces and ladder steps	480
4	3x12	18	Bull wheel arms—S.4.S. 2½"x11"	216
2	3x12	16	Calf wheel arms—S.4.S. 2½"x11"	96
			Total Oregon Pine	24,525
			1—Set band wheel cants for 10-foot wheel	
			1—Set tug pulley cants for 6-foot wheel	
			1—Set bull wheel cants, arms and handles for 7½-foot wheel	
			1—Set calf wheel cants, arms and handles for 7-foot wheel	
			HARDWOOD	
1	16x16	6	Oak calf wheel shaft	128
1	5x 6	16	Oak top of crown block	40
1	5x 6	14	Oak top of crown block	35
1	2x12	16	Oak top of beams and dog	32
			Total Hardwood	235

Ideal Rig Irons

WITH CLUTCH SPROCKET ATTACHMENT

(Patented)

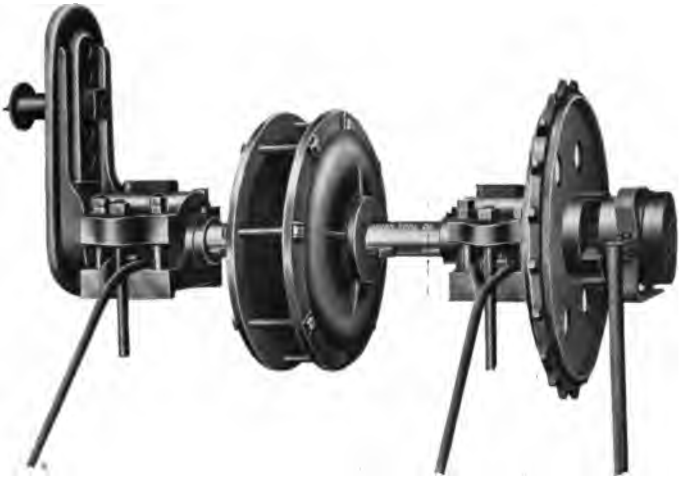


Fig. 2

SPECIFICATION OF COMPLETE SET

	Weight in Pounds	
Diameter of Shaft Inches	5	6
1—7½-foot shaft (5 or 6 inches), crank, wrist pin, 1 set 36-inch flanges and bolts, collars, keys and 42-inch sprocket calf wheel attachment	2585	2845
1—Sprocket tug rim, 7 feet	516	516
1—Jack post box and cap, 5x14 or 6x14 inches	660	626
1—Calf wheel box and cap, 5x12 or 6x12 inches	478	446
4—Turnbuckle rods, 1¼ inches x 8½ feet	196	196
2—Jack post rods, 1½ inches x 8⅓ feet	110	110
1—Jack post plate, 2x6x22 inches	75	75
2—Eye bolts, 1½x48 inches	66	66
1—Double end bolt, 1½x26 inches	18	18
2—Eye bolts, ⅞x18 inches	9	9
1—Double end bolt, ⅞ inch x 8 feet	17	17
2—Double end bolts, ⅞ inch x 9½ feet	41	41
1—Set center irons and bolts	540	540
1—Set (2) 16x4½-inch bull wheel gudgeons, ½x2½-inch bands and 8—1x20-inch bolts	250	250
1—Only 16x4½-inch calf wheel gudgeon, ½x2½-inch band and 4—1x20-inch bolts	125	125
1—Only 30x4½-inch flanged calf wheel gudgeon, ½x2½-inch band and 4—1x20-inch bolts	285	285
1—Brake band, ¼x7 inches x 28 feet, with lever and staple	280	280
1—Brake band, 3/16x6 inches x 28 feet, with lever and staple	165	165
1—Round walking beam stirrup, 2½ inches	135	135
1—Crown pulley, 30x4½ inches	265	....
1—Crown pulley, 36x4½ inches	....	345
1—Sand line sheave, 24x3⅞ inches	160	160
4—Casing line pulleys, 22x4½ inches	732	732
55 feet sprocket chain, No. 1030	440	440
Total weight for the set	8148	8422

FOR ILLUSTRATIONS OF PARTS, SEE PAGES 7 TO 10 INCLUSIVE.
PRICES UPON APPLICATION.

Ideal Rig Iron Parts

NAME OF PART	WEIGHT IN POUNDS*	
	5-inch	6-inch
Ideal shaft complete—consisting of: key-seated shaft, crank, wrist pin set of 36-inch flanges, collars, keys, bolts, and 42-inch sprocket calf wheel attachment	2585	2845
Shaft only, 7′ 6″ long	475	690
Crank only	544	544
Crank key	3	3
Wrist pin complete	52	52
Wrist pin only	37	37
Wrist pin nut only	10	10
Wrist pin washers (2)	5	5
Wrist pin cotter	....	....
Flanges complete with bolts, per set, 36 inches	730	730
Flange bolts, 8—⅞x10-inch machine bolts	17	17
Flange keys (4)	12	12
Set collars with set screws (2)	26	46
Clutch sprocket wheel, 42-inch	470	470
Plain clutch	161	185
Clutch strap	14	15
Clutch lever	88	88
Clutch keys (2)	10	10
Sprocket tug rim, 7-foot	516	516
Jack post box and cap, 5x14 inches, complete with bolts	660	....
Jack post box and cap, 6x14 inches, complete with bolts	....	626
Calf wheel box and cap, 5x12 inches, complete with bolts	478	....
Calf wheel box and cap, 6x12 inches, complete with bolts	....	446
Jack post boxes only, 5x14 inches	292	....
Jack post boxes only, 6x14 inches	....	270
Calf wheel boxes only, 5x12 inches	225	....
Calf wheel boxes only, 6x12 inches	....	208
Jack post box caps only, 5x14 inches	342	....
Jack post box caps only, 6x14 inches	....	330
Calf wheel box caps only, 5x12 inches	228	....
Calf wheel box caps only, 6x12 inches	....	213
Bolts for jack post boxes (4—1¼x13-inch bolts to each box)	26	26
Bolts for calf wheel boxes (4—1¼x11¾-inch bolts to each box)	25	25
Turnbuckle rods, 1¼″x8′ 6″ (4)	196	196
Jack post rods, 1½″x8′ 4″ (2)	110	110
Jack post plate, 2x6x22 inches	75	75
Double end bolts, 1½x26 inches (1)	18	18
Double end bolts, ⅞″x8′ (1)	17	17
Double end bolts, ⅞″x9′ 6″ (2)	41	41
Eye bolts, ⅞x18 inches (2)	9	9
Eye bolts, 1½x48 inches (2)	66	66
Center irons complete with bolts, 5-inch, per set	540	540
Saddle only, for 5-inch center irons	198	198
Saddle bolts, 4—⅞x28-inch machine bolts	20	20
Side irons, for 5-inch center irons, per set (2)	225	225
Side iron bolts, 6—⅞x20-inch machine bolts	23	23
Side iron caps, for 5-inch center irons, per set (2)	70	70
Side iron cap bolts, 4—⅞x4-inch machine bolts	4	4
Bull wheel gudgeons, 16x4½-inch, complete with ½x2½-inch bands and 8—1x20-inch bolts, per set (2)	250	250
Bull wheel gudgeons only, 16x4½-inch, per set (2)	176	176
Bull wheel gudgeon bands, ½x2½-inch, per set (2)	34	34
Bull wheel gudgeon bolts, 8—1x20-inch, for the set	40	40
Calf wheel gudgeon, 16x4½-inch, complete with ½x2½-inch band and 4—1x20-inch bolts (1)	125	125
Calf wheel gudgeon only, 16x4½-inch (1)	88	88
Calf wheel gudgeon band, ½x2½-inch (1)	17	17
Calf wheel gudgeon bolts, 4—1x20-inch	20	20
Flanged calf wheel gudgeon, 30x4½-inch, complete with ½x2½-inch band and 4—1x20-inch bolts (1)	285	285
Flanged calf wheel gudgeon only, 30x4½-inch (1)	248	248
Flanged calf wheel gudgeon band, ½x2½-inch (1)	17	17
Flanged calf wheel gudgeon bolts, 4—1x20-inch	20	20
Brake band, staple and lever, ¼″x7″x28′	280	280
Brake band and staple, ¼″x7″x28′	180	180
Brake band lever, 2-inch	100	100
Brake band, staple and lever, 3/16″x6″x28′	165	165
Brake band and staple, 3/16″x6″x28′	110	110
Brake band lever, 1½-inch	55	55
Walking beam stirrup, 2½-inch round iron	135	135
Crown pulley, 30-inch, 4½-inch gudgeons	265	....
Crown pulley, 36-inch, 4½-inch gudgeons	....	345
Sand line sheave, 24-inch, 3⅞-inch gudgeons	160	160
Casing line pulleys, 22-inch, 4½-inch gudgeons (4)	732	732
Sprocket chain No. 1030 (55 feet)	8 lbs. per foot	8 lbs. per foot

*Weights shown are for the quantities as enumerated.

Ideal Rig Irons

SPECIFICATIONS FOR 7½-INCH IDEAL RIG IRONS

SPECIFICATION OF COMPLETE SET	Weight in Pounds*
1—7½"x8′ 2" shaft, crank, wrist pin, one set 48-inch flanges and bolts, collars, keys and 42-inch sprocket calf wheel attachment	4962
1—Sprocket tug rim, 7 feet	516
1—Jack post box and cap, 7½x16x16 inches	1227
1—Calf wheel box and cap, 7½x16x14 inches	1080
2—Turnbuckle rods, 2 inches x 10⅔ feet	294
2—Turnbuckle rods, 1½ inches x 10⅔ feet	164
2—Jack post rods, 2 inches x 9⅝ feet	220
2—Calf wheel post rods, 2 inches x 7⅝ feet	180
2—Plates with holes for 2-inch rods, 2x8x30 inches	264
2—Eye bolts, ⅞x18 inches	9
1—Double end bolt, ⅞ inch x 8 feet	17
2—Double end bolts, ⅞ inch x 9½ feet	41
1—Set center irons and bolts, 6-inch for 14-inch beam	927
1—Set (2) 16x5-inch cast iron bull wheel gudgeons, ½x3-inch bands and 4—1x20-inch and 4—1x28 inch bolts with 2-inch square heads and nuts	270
1—Set (2) 16x5-inch forged steel calf wheel gudgeons, ½x3-inch bands with holes for 1-inch bolts	220
1—¼x8 inches x 28-foot brake band with staple and 1¾-inch lever	290
1—¼x7 inches x 28-foot brake band with staple and 1¾-inch lever	280
1—Special walking beam stirrup, 3x30 inches, 6 bolt for 14-inch beam	295
1—Sand line sheave, 24x3⅞ inches	160
1—Crown pulley, 36x4½ inches	345
4—Casing line pulleys, 22x4½ inches	732
55 feet steel sprocket chain, No. 1030	330
Total weight for the set	12823

PARTS

PARTS DETAILED	Weight in Pounds*
SHAFT AND SPROCKET ATTACHMENT	
1—7½"x8′ 2" shaft only	1210
1—Extra heavy crank only	762
1—Crank key	4
1—Wrist pin complete	73
1—Set 48-inch flanges complete with bolts	1750
4—Flange keys	15
2—7½-inch set collars with set screws	104
1—42-inch clutch sprocket wheel	568
1—Plain clutch	328
1—Clutch strap	43
1—Clutch lever	95
2—Clutch keys	10
JACK POST BOX	
1—7½"x16"x16" jack post box only	590
1—7½"x16"x16" jack post box cap only	590
4—1½"x16½" jack post box bolts	47
CALF WHEEL BOX	
1—7½"x16"x14" calf wheel box only	525
1—7½"x16"x14" calf wheel box cap only	525
4—1¼"x16" calf wheel box bolts	30
CENTER IRONS	
1—6-inch saddle	345
2—6-inch side irons	390
2—6-inch side iron caps	136
4—⅞"x34" saddle bolts	22
6—1"x20" side iron bolts	28
4—1"x5" side iron cap bolts	6
BULL WHEEL GUDGEONS	
2—16" cast iron bull wheel gudgeons with 5" bearings	166
2—½"x3" gudgeon bands	50
4—1"x20" bolts with 2" square heads and nuts	24
4—1"x28" bolts with 2" square heads and nuts	30
CALF WHEEL GUDGEONS	
2—16" forged steel calf wheel gudgeons with 5" bearings and 7 holes for 1" bolts	170
2—½"x3" gudgeon bands	50

*Weights shown are for the quantities enumerated in the first column.

PRICES UPON APPLICATION.

Ideal Rig Irons

PARTS

SHAFT COMPLETE
LESS SPROCKET ATTACHMENT

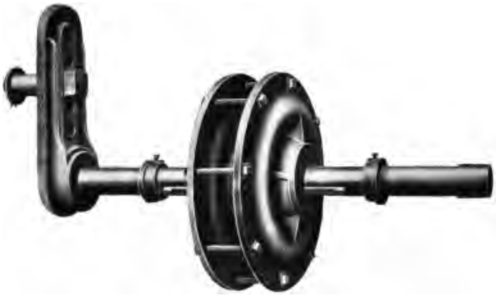


Fig. 3

FLANGE KEY

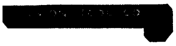


Fig. 4

CLUTCH KEY

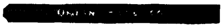


Fig. 5

JACK POST
OR CALF WHEEL BOX

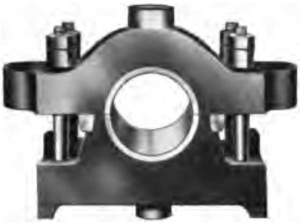


Fig. 6

END VIEW OF JACK POST
OR CALF WHEEL BOX

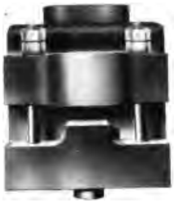


Fig. 7

SET COLLAR

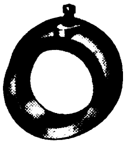


Fig. 8

WRIST PIN

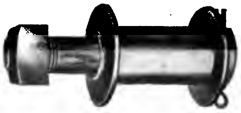


Fig. 9

SHAFT AND CRANK

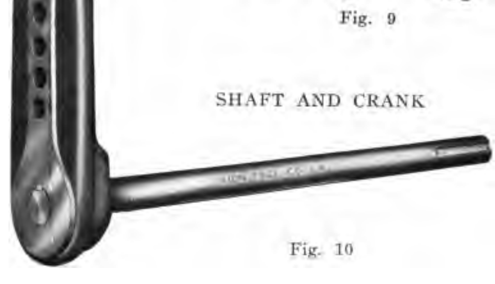


Fig. 10

FLANGES

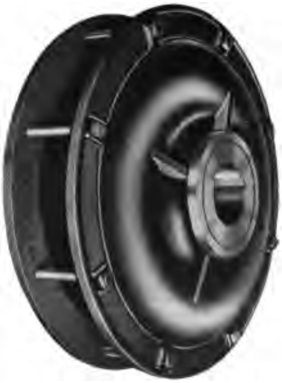


Fig. 11

FOR DESCRIPTION AND WEIGHTS, SEE PAGE 5.
PRICES UPON APPLICATION.

Ideal Rig Irons

PARTS

BULL OR CALF WHEEL GUDGEON

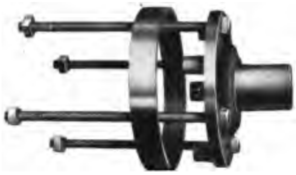


Fig. 12

FLANGED CALF WHEEL GUDGEON

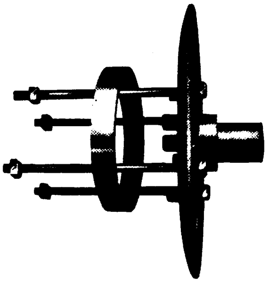


Fig. 13

CROWN PULLEY

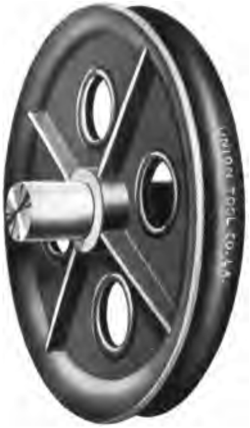


Fig. 14

SAND LINE SHEAVE

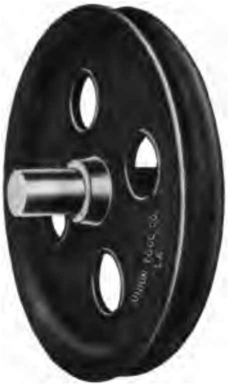


Fig. 15

CASING LINE PULLEY

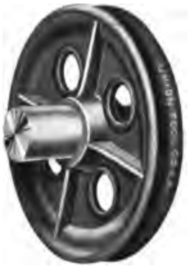


Fig. 16

CENTER IRONS

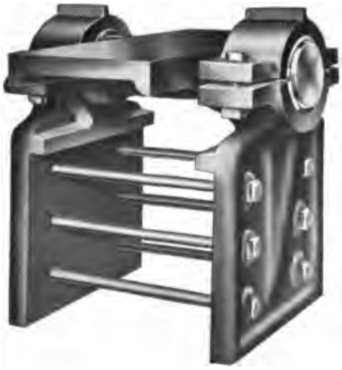


Fig. 17

BRAKE BAND LEVER

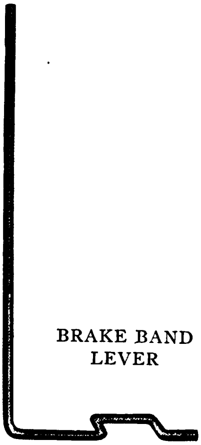


Fig. 18

BRAKE BAND AND STAPLE

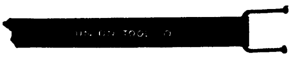


Fig. 19

WALKING BEAM STIRRUP

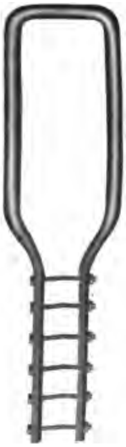


Fig. 20

FOR DESCRIPTION AND WEIGHTS, SEE PAGE 5.
PRICES UPON APPLICATION.

Ideal Rig Irons

PARTS

SPROCKET TUG RIM

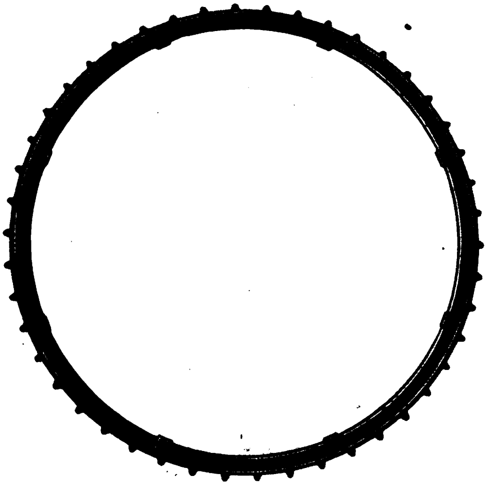


Fig. 21

SPROCKET CLUTCH

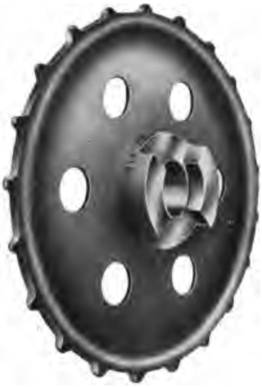


Fig. 22

PLAIN CLUTCH AND STRAP

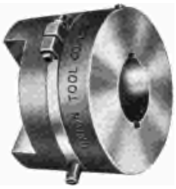


Fig. 23

CLUTCH STRAP

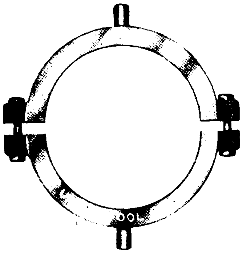


Fig. 24

SPROCKET CHAIN
No. 1030

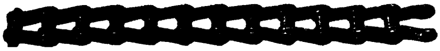


Fig. 25

CLUTCH LEVER

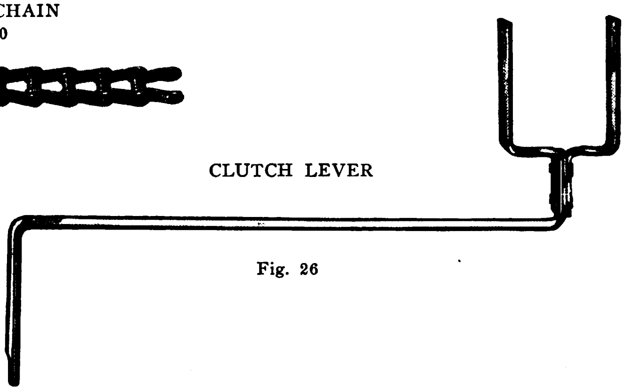


Fig. 26

FOR DESCRIPTION AND WEIGHTS, SEE PAGE 5.
PRICES UPON APPLICATION.

Ideal Rig Irons

PARTS

TURNBUCKLE ROD

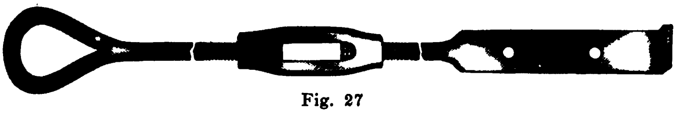


Fig. 27

EYE BOLT—1½"x48"

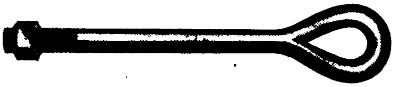


Fig. 28

EYE BOLT—⅞"x18"

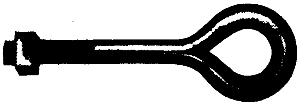


Fig. 29

DOUBLE END BOLT—1½"x26"

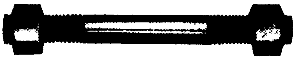


Fig. 30

JACK POST PLATE

Fig. 31

JACK POST ROD—1½"x8' 4"

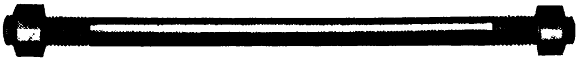


Fig. 32

DOUBLE END BOLT—⅞"x8'

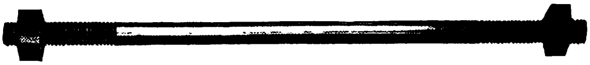


Fig. 33

DOUBLE END BOLT—⅞"x9' 6"

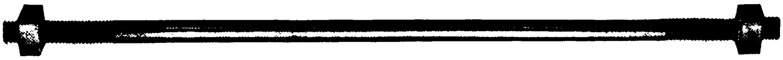


Fig. 34

FOR DESCRIPTION AND WEIGHTS, SEE PAGE 5.
PRICES UPON APPLICATION.

FOR OTHER SIZES SEE LIST OF EYE, HOOK AND DOUBLE END BOLTS SHOWN ON PAGE 11.

Eye Bolts

LIST PRICES—EACH

Diameter, Inches	Length, Inches	Price, Each	Diameter, Inches	Length, Inches	Price, Each
¾	16	$0.75	1	16	$1.10
¾	18	.80	1	18	1.20
¾	20	.85	1	20	1.30
¾	22	.90	1	22	1.40
¾	24	.95	1	24	1.50
¾	26	1.00	1	28	1.70
¾	28	1.05	1	30	1.80
¾	30	1.10	1	34	2.00
¾	36	1.25	1	36	2.10
¾	42	1.40	1¼	48	2.00
¾	96	3.10	1¼	90	3.00
⅞	16	.80	1¼	94	3.25
⅞	18	.85	1¼	96	3.40
⅞	20	.90	1¼	98	3.55
⅞	22	.95	1¼	102	3.90
⅞	24	1.00	1½	48	3.00
⅞	30	1.25	1½	90	4.25
⅞	34	1.45	1½	96	4.50
⅞	36	1.55	1½	102	4.75

Hook and Double End Bolts

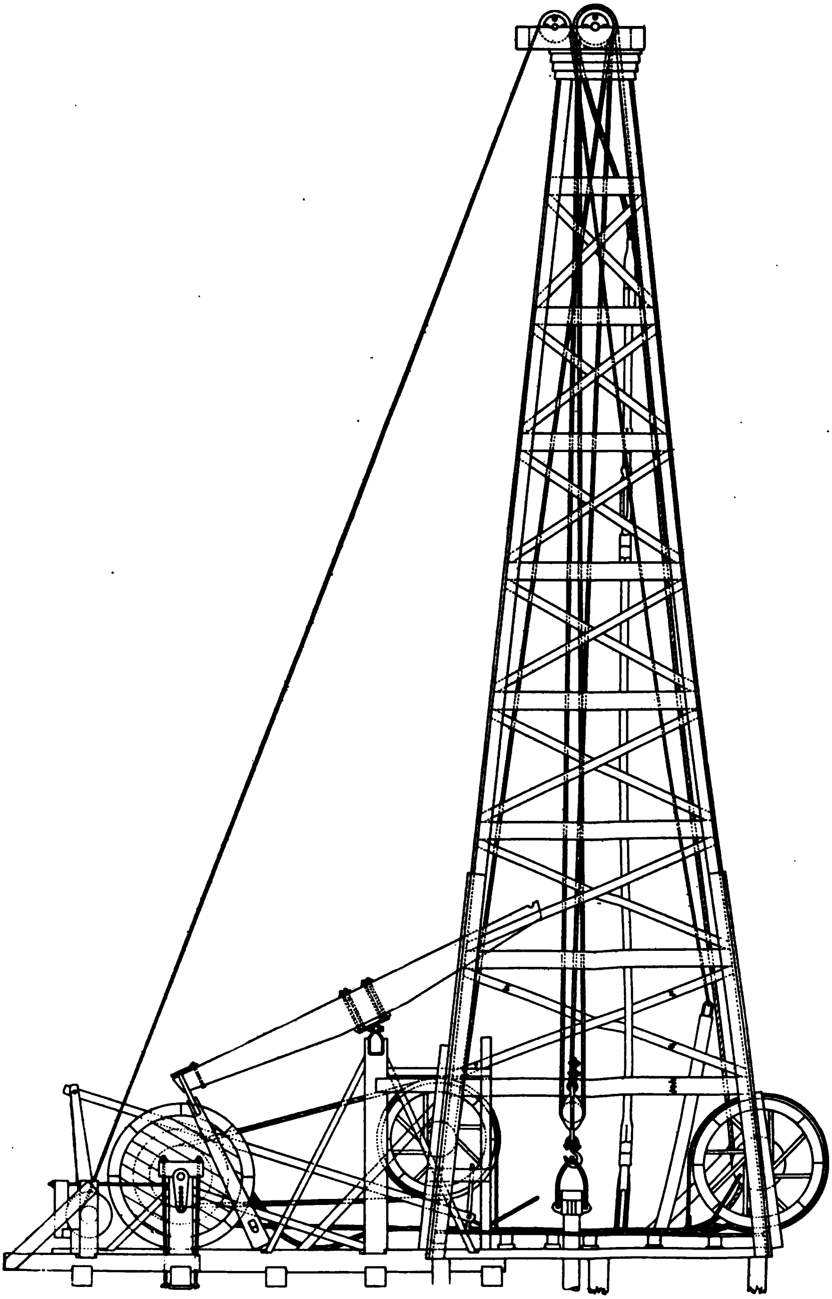
LIST PRICES—EACH

Length, Feet	DIAMETER IN INCHES						
	¾	⅞	1	1⅛	1¼	1½	1¾
1	$0.60	$0.80	$1.00	$1.30	$1.60	$2.40	$3.50
1½	.80	1.05	1.35	1.75	2.15	3.20	4.55
2	1.00	1.30	1.70	2.20	2.70	4.00	5.60
2½	1.20	1.55	2.05	2.65	3.25	4.80	6.65
3	1.40	1.80	2.40	3.10	3.80	5.60	7.70
3½	1.60	2.05	2.75	3.55	4.35	6.40	8.75
4	1.80	2.30	3.10	4.00	4.90	7.20	9.80
4½	2.00	2.55	3.45	4.45	5.45	8.00	10.85
5	2.20	2.80	3.80	4.90	6.00	8.80	11.90
5½	2.40	3.05	4.15	5.35	6.55	9.60	12.95
6	2.60	3.30	4.50	5.80	7.10	10.40	14.00
6½	2.80	3.55	4.85	6.25	7.65	11.20	15.05
7	3.00	3.80	5.20	6.70	8.20	12.00	16.10
7½	3.20	4.05	5.55	7.15	8.75	12.80	17.15
8	3.40	4.30	5.90	7.60	9.30	13.60	18.20
8½	3.60	4.55	6.25	8.05	9.85	14.40	19.25
9	3.80	4.80	6.60	8.50	10.40	15.20	20.30
9½	4.00	5.05	6.95	8.95	10.95	16.00	21.35
10	4.20	5.30	7.30	9.40	11.50	16.80	22.40
11	4.60	5.80	8.00	10.30	12.60	18.40	24.50
12	5.00	6.30	8.70	11.20	13.70	20.00	26.60
13	5.40	6.80	9.40	12.10	14.80	21.60	28.70
14	5.80	7.30	10.10	13.00	15.90	23.20	30.80
15	6.20	7.80	10.80	13.90	17.00	24.80	32.90

APPROXIMATE WEIGHT—4 POUNDS FOR EACH DOLLAR OF LIST.

Standard Rig

SHOWING CALF WHEEL OUTFIT FOR HANDLING CASING



SIDE ELEVATION
Fig. 35

Standard Rig

TIMBER AND LUMBER REQUIRED TO BUILD A COMPLETE RIG DERRICK 82 FEET HIGH WITH BASE 20 FEET SQUARE

Pieces	Size, Inches	Length, Feet	OREGON PINE	Feet
1	12x12x12x26	26	Walking beam	676
1	22x22	9	Engine block	363
1	16x16	30	Main sill	640
1	16x16	20	Sub sill	427
1	16x16	16	Sampson post	341
1	16x16	14	Bull wheel shaft	299
1	16x16	6	Calf wheel shaft	128
4	14x14	16	Mud sills	1045
1	14x14	16	Tail sill and post	261
1	14x14	16	Nose sill and jack post caps	261
2	14x14	14	Engine mud sills	457
2	14x14	12	Casing sills	392
1	14x14	12	Jack post	196
1	12x12	20	Back brake and blocking	240
1	10x12	24	Bull wheel post	240
1	10x12	24	Calf wheel post	240
1	10x12	14	Bumper	140
2	10x12	12	Pony sills	240
2	8x 8	22	Side sills	235
11	8x 8	20	Derrick sills and blocking	1173
1	6x 6	26	Bunting pole	78
1	6x 6	20	Dead man	60
2	6x 6	18	Jack post braces	108
1	6x 6	16	Calf wheel post braces	48
5	6x 6	14	Back brake, headache post, sampson post and bull wheel braces	210
5	4x 6	16	Calf wheel and short braces	160
2	5x16	16	Crown block	213
1	5x16	12	Knuckle post	80
2	5x5x5x14	12	Pitman and swing lever	140
1	14x14	20	Blocking	327
14	2x12	20	Band wheel centers (S.1.S)	560
54	2x12	20	Derrick floor, walk and girts	2160
8	2x12	18	Derrick foundation and girts	288
8	2x12	16	Girts and top of derrick	256
4	2x12	14	Girts	112
6	2x10	26	Starting legs and belt house sills	260
4	2x 8	18	Starting legs	96
28	2x10	24	Doublers	1120
20	2x10	16	Derrick legs	533
20	2x 8	16	Derrick legs	427
12	2x 8	18	Derrick roof, forge and belt house	288
1	2x 8	24	Bunting pole to jack post	32
5	2x 6	26	Belt house frame	130
17	2x 6	20	Braces	340
8	2x 6	18	Braces	144
12	2x 6	16	Braces to cut	192
2	2x 6	14	Engine house frame	28
3	2x 6	12	Engine house frame	36
3	2x 4	14	Engine house frame	28
3	2x 4	12	Engine house frame	24
20	2x 4	16	Ladders	213
30	1x12	20	Siding	600
75	1x12	18	Siding	1350
146	1x12	16	Girts and siding	2336
50	1x12	14	Engine house siding	700
60	1x12	12	Siding	720
60	1x 6	16	Braces and ladder steps	480
			Total Oregon Pine	23,871
			1—Set band wheel cants for 9-foot wheel	
			1—Set tug pulley cants for 5-foot wheel	
			1—Set bull wheel cants, arms and handles for 7½ foot wheel	
			1—Set calf wheel cants, arms and handles for 7 foot wheel	
			HARDWOOD	
1	4x 5	16	Oak top of crown block	27
1	4x 5	14	Oak top of crown block	23
1	2x12	16	Oak top of beams and dog	32
			Total Hardwood	82

Standard Rig Irons

SPECIFICATION FOR 4-INCH STANDARD RIG IRONS

SHIPPING WEIGHT, 2276 LBS.

1—4"x6'-6" shaft, crank, set of 30-inch flanges, wrist pin, collar, keys and bolts.
1—32-inch crown pulley.
1—24-inch sand line sheave, steel gudgeons.
1—Set 4-inch center irons complete with bolts.
1—Set 16-inch bull wheel gudgeons, with ½x2½-inch bands and 8—1x20" bolts.
1—3/16"x6"x28' brake band, lever and staple.
1—2½-inch round iron walking beam stirrup.

SPECIFICATION FOR 4½-INCH STANDARD RIG IRONS

SHIPPING WEIGHT, 2523 LBS.

1—4½"x6'-6" shaft, crank, set of 36-inch flanges, wrist pin, collar, keys and bolts.
1—32-inch crown pulley.
1—24-inch sand line sheave, steel gudgeons.
1—Set 4-inch center irons complete with bolts.
1—Set 16-inch bull wheel gudgeons, with ½x2½-inch bands and 8—1x20" bolts.
1—3/16"x6"x28' brake band, lever and staple.
1—2½-inch round iron walking beam stirrup.

SPECIFICATION FOR 5-INCH STANDARD RIG IRONS

SHIPPING WEIGHT, 3010 LBS.

1—5"x6'-6" shaft, crank, set of 36-inch flanges, wrist pin, collar, keys and bolts.
1—32-inch crown pulley.
1—24-inch sand line sheave, steel gudgeons.
1—Set 5-inch center irons complete with bolts.
1—Set 16-inch bull wheel gudgeons, with ½x2½-inch bands and 8—1x20" bolts.
1—¼"x7"x28' brake band, lever and staple.
1—2½-inch round iron walking beam stirrup.

SPECIFICATION FOR 6-INCH STANDARD RIG IRONS

SHIPPING WEIGHT, 3539 LBS.

1—6"x6'-6" shaft, crank, set of 36-inch flanges, wrist pin, collar, keys and bolts.
1—36-inch crown pulley.
1—24-inch sand line sheave, steel gudgeons.
1—Set 5-inch center irons complete with bolts.
1—Set 16-inch bull wheel gudgeons, with ½x2½-inch bands and 8—1x20" bolts.
1—¼"x7"x28' brake band, lever and staple.
1—2½-inch round iron walking beam stirrup.

SPECIFICATION FOR CALF IRONS FOR STANDARD RIG IRONS

SHIPPING WEIGHT, 2020 LBS.

1—48-inch open side calf tug wheel and key.
1—90-inch rope tug rim.
1—only 16-inch calf wheel gudgeon, with ½x2½-inch band and 4—1x20" bolts.
1—30-inch flanged calf wheel gudgeon, with ½x2½-inch band and 4—1x20" bolts.
1—3/16"x6"x28' brake band, lever and staple.
4—22-inch casing line pulleys.

Standard Rig Iron Parts

NAME OF PART	WEIGHT IN POUNDS*			
	4-inch	4½-inch	5-inch	6-inch
Standard shaft complete—consisting of: Key-seated shaft, crank, flanges, wrist pin, collar, keys and bolts	1046	1293	1460	1964
Shaft only, 6′ 6″ long, single key seat	260	330	....	....
Shaft only, 6′ 6″ long, double key seat	....	....	410	600
Crank only	275	275	350	544
Crank key, ⅞x6 inches	2	....	....	....
Crank key, 1x6 inches	....	2	....	....
Crank key, 1¼x6 inches	....	....	3	3
Wrist pin complete	52	52	52	52
Wrist pin only	37	37	37	37
Wrist pin nut only	10	10	10	10
Wrist pin washers (2)	5	5	5	5
Flanges complete with bolts, per set, 30 inches	445	....	....	....
Flanges complete with bolts, per set, 36 inches	....	620	620	730
Flange bolts, 8—¾x9-inch machine bolts	15	15	....	....
Flange bolts, 8—⅞x10-inch machine bolts	....	....	17	17
Flange keys, (4—⅞x6½-inch)	3	....	....	....
Flange keys, (4—1x6½-inch)	....	4	....	....
Flange keys, (4—1¼x6½-inch)	....	....	12	12
Set collar with set screw	9	10	13	23
Crown pulley, 32-inch, 3⅞-inch gudgeons	270	270	270	....
Crown pulley, 36-inch, 3⅞-inch gudgeons	....	....	....	295
Sand line sheave, 24-inch, steel gudgeons	95	95	95	95
Bull wheel gudgeons, 16-inch, complete with ½x2½-inch bands and bolts, per set (2)	230	230	230	230
Bull wheel gudgeons only, 16-inch, per set (2)	156	156	156	156
Bull wheel gudgeon bands, ½x2½-inch, per set (2)	34	34	34	34
Bull wheel gudgeon bolts, 8—1x20-inch, for the set	40	40	40	40
Center irons complete with bolts, 4-inch, per set	335	335	....	....
Center irons complete with bolts, 5-inch, per set	....	....	540	540
Saddle only, for 4-inch center irons	125	125	....	....
Saddle only, for 5-inch center irons	....	....	198	198
Saddle bolts, 4—¾x28-inch machine bolts	15	15	....	....
Saddle bolts, 4—⅞x28-inch machine bolts	....	....	20	20
Side irons, for 4-inch center irons, per set (2)	136	136	....	....
Side irons, for 5-inch center irons, per set (2)	....	....	225	225
Side iron bolts, 4—¾x20-inch machine bolts	11	11	....	....
Side iron bolts, 6—⅞x20-inch machine bolts	....	....	23	23
Side iron caps, for 4-inch center irons, per set (2)	45	45	....	....
Side iron caps, for 5-inch center irons, per set (2)	....	....	70	70
Side iron cap bolts, 4—¾x3½-inch machine bolts	3	3	....	....
Side iron cap bolts, 4—⅞x4 -inch machine bolts	....	....	4	4
Brake band, staple and lever, $\frac{3}{16}$″x6″x28′—complete	165	165	....	....
Brake band and staple, $\frac{3}{16}$″x6″x28′	110	110	....	....
Brake band lever, 1½-inch	55	55	....	....
Brake band, staple and lever, ¼″x7″x28′—complete	....	....	280	280
Brake band and staple, ¼″x7″x28′	....	....	180	180
Brake band lever, 2-inch	....	....	100	100
Walking beam stirrup, 2½-inch round iron	135	135	135	135

CALF IRON PARTS FOR STANDARD RIG IRONS

NAME OF PART	Weight in Pounds*
Calf tug wheel and key, open side, 48-inch for 4, 4½ or 5-inch shaft	460
Calf tug wheel and key, open side, 48-inch for 6-inch shaft	560
Rope tug rim, 72 inches diameter	360
Rope tug rim, 78 inches diameter	390
Rope tug rim, 90 inches diameter	450
Rope tug rim, 96 inches diameter	475
Calf wheel gudgeon, 16-inch, complete with ½x2½-inch band and 4—1x20-inch bolts (1)	115
Calf wheel gudgeon only, 16-inch (1)	78
Calf wheel gudgeon band, ½x2½-inch (1)	17
Calf wheel gudgeon bolts, 4—1x20-inch	20
Flanged calf wheel gudgeon, 28-inch, complete with ½x2½-inch band and 4—1x20-inch bolts (1)	225
Flanged calf wheel gudgeon only, 30-inch (1)	223
Flanged calf wheel gudgeon band, ½x2½-inch (1)	17
Flanged calf wheel gudgeon bolts, 4—1x20-inch	20
Flanged calf wheel gudgeon, 30-inch, complete with ½x2½-inch band and 4—1x20-inch bolts (1)	260
Flanged calf wheel gudgeon only, 30-inch (1)	223
Flanged calf wheel gudgeon band, ½x2½-inch (1)	17
Flanged calf wheel gudgeon bolts, 4—1x20-inch	20
Brake band, staple and lever, $\frac{3}{16}$″x6″x28′—complete	165
Brake band and staple, $\frac{3}{16}$″x6″x28′	110
Brake band lever, 1½-inch	55
Casing line pulleys, 22-inch, 3⅞-inch gudgeons (4)	570

*Weights shown are for the quantities as enumerated.

FOR ILLUSTRATIONS OF PARTS, SEE PAGES 16 AND 17.

Standard Rig Irons

PARTS

FLANGE KEY

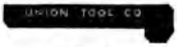


Fig. 36

SET COLLAR

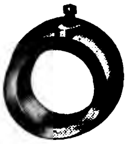


Fig. 37

WALKING BEAM STIRRUP

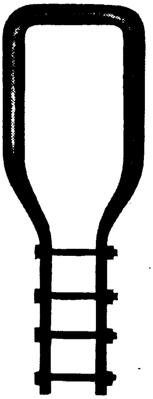


Fig. 39

SHAFT AND CRANK

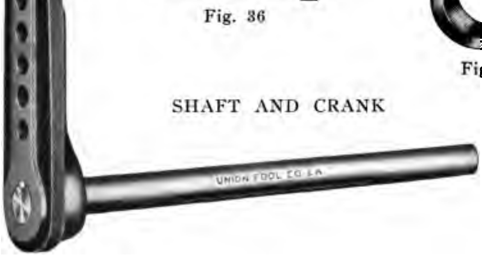


Fig. 38

WRIST PIN

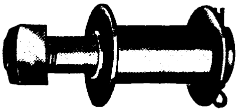


Fig. 40

BULL OR CALF WHEEL GUDGEON

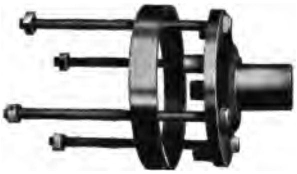


Fig. 41

BRAKE BAND LEVER

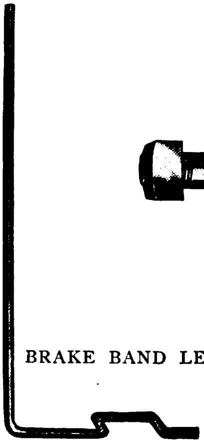


Fig. 42

BRAKE BAND AND STAPLE

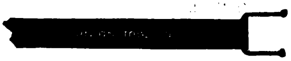


Fig. 43

SAND LINE SHEAVE

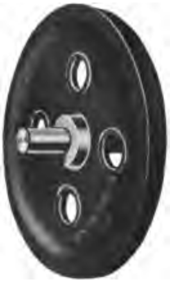


Fig. 44

CROWN PULLEY

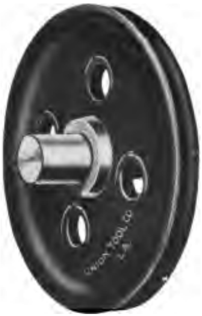


Fig. 45

CENTER IRONS

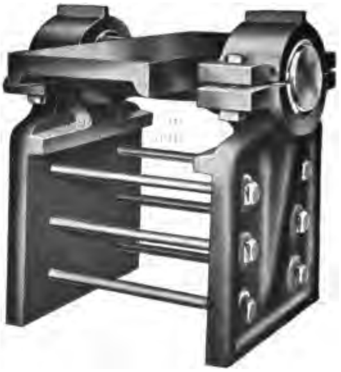


Fig. 46

FOR DESCRIPTION AND WEIGHTS, SEE PAGE 15.
PRICES UPON APPLICATION.

Standard Rig Irons

CALF IRON PARTS

CALF TUG WHEEL

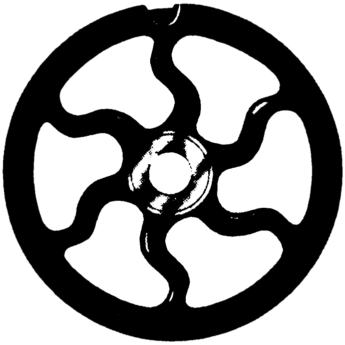


Fig. 47

FLANGED CALF WHEEL GUDGEON

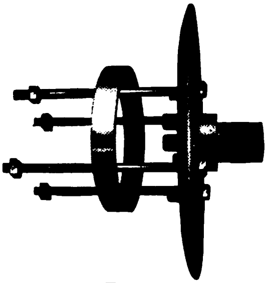


Fig. 48

ROPE TUG RIM

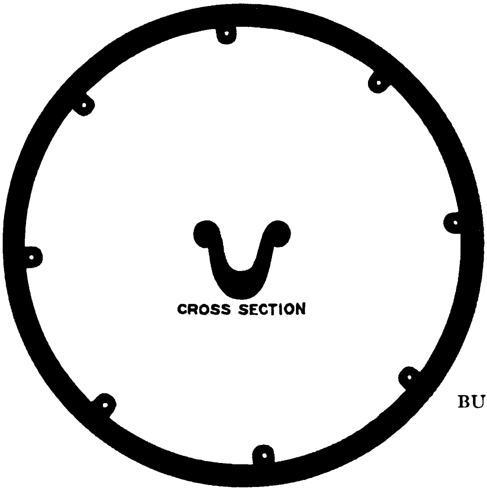


Fig. 49

CASING LINE PULLEY

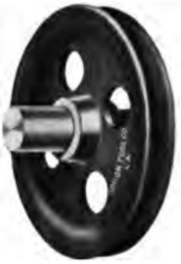


Fig. 50

BULL OR CALF WHEEL GUDGEON

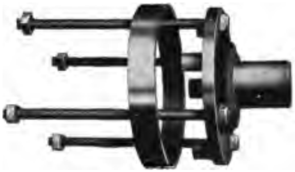


Fig. 51

BRAKE BAND LEVER

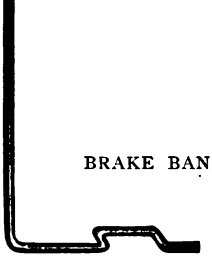


Fig. 52

BRAKE BAND AND STAPLE

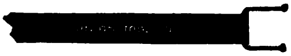


Fig. 53

FOR DESCRIPTION AND WEIGHTS, SEE PAGE 15.
PRICES UPON APPLICATION.

Open Jack Post Boxes

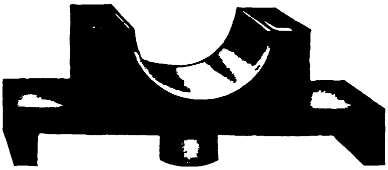


Fig. 54

Size ....inches	4	4	4	4	4½	4½	4½	4½	5	5
For size timbers.inches	12	14	16	18	12	14	16	18	12	14
Weight ....pounds	100	111	121	131	100	114	120	130	103	113
Price ....each	$10.50	$11.00	$11.50	$12.50	$11.00	$11.50	$12.00	$13.00	$12.00	$12.50

Size ....inches	5	5	5½	5½	5½	5½	6	6	6	6
For size timbers.inches	16	18	12	14	16	18	12	14	16	18
Weight ....pounds	126	136	106	116	126	138	108	118	128	140
Price ....each	$13.00	$14.00	$12.50	$13.00	$13.50	$14.50	$13.00	$13.50	$14.00	$15.00

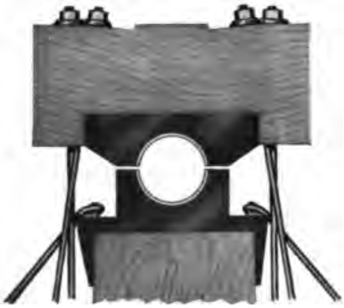


Fig. 55

Cokely Jack Post Boxes

Size ....inches	4	4½	5	6
For size timbers....inches	16	16	16	16
Weight of cap.....pounds	......	......	......	94
Weight of box....pounds	......	......	166	174
Price of cap........each	$10.50	$11.00	$11.50	$12.00
Price of box........each	18.00	19.00	20.00	21.00

Jack Post Stirrups

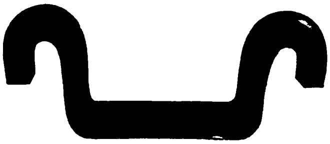


Fig. 56

Size, Inches	Weight, Pounds	Price, Each	Size, Inches	Weight, Pounds	Price, Each
1 x5x14	48	$ 7.00	1 x5x16	50	$ 7.50
1¼x5x14	60	9.00	1¼x5x16	65	9.75
1½x5x14	80	12.00	1½x5x16	85	12.75
2 x5x14	107	15.75	2 x5x16	113	17.00
1 x6x14	57	8.50	1 x6x16	61	9.00
1¼x6x14	75	11.25	1¼x6x16	78	11.50
1½x6x14	96	14.25	1½x6x16	110	16.50
2 x6x14	142	21.50	2 x6x16	150	22.50

Smith and Hess Iron Pitmans

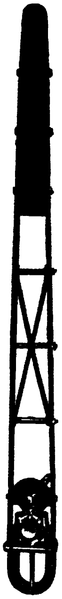


Fig. 57

This Pitman will eliminate the lost motion on the wrist pins and will not work out to the end of them, causing them to break.

It will also do away with the using of keys and outlast a dozen wooden pitmans. It is economical and will save its cost in quick adjustment and in the time saved in connecting and disconnecting from the wrist pin.

All the parts are of metal, with the exception of the hardwood, by which it is bolted to the walking beam stirrup. Ample bracing is provided, insuring strength and durability.

	Weight, Pounds	Price, Each
Smith and Hess iron Pitman complete....................	421	$50.00

PARTS

Symbol Number	PART	Weight, Pounds	Price, Each	Symbol Number	PART	Weight, Pounds	Price, Each
1	Large casting....	65	$14.00	9	Braces	14	$2.00
2	Band	145	14.00	10	Handle	4	2.00
3	Cap	12	4.00	11	Hardwood	51	2.75
4	Cam	6	1.50	12	Wrist pin.......	46	7.50
5	Crank or lever..	7	3.00	13	Cap spring (2)..	..	.15
6	Box with dial...	19	3.00	14	Cap screw, ⅜x1¼"	..	.10
7	Brass slide......	2	1.50	15	Cap screw, ½x1¾"	..	.10

Smith and Hess Trusses

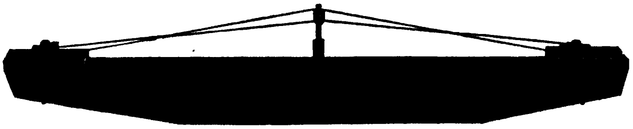
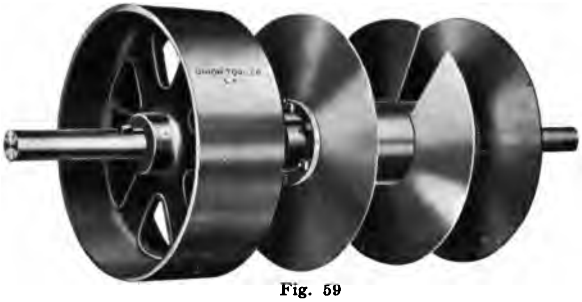


Fig. 58

SIZE	Weight, Pounds	Price, Each
12-inch new style trusses—complete less rope.........................	230	$32.50
14-inch new style trusses—complete less rope.........................	240	35.00
12-inch old style trusses—complete less rope.........................	492	45.00
14-inch old style trusses—complete less rope.........................	552	47.50

PARTS

PART	New Style				Old Style			
	12-inch		14-inch		12-inch		14-inch	
	Weight, Pounds	Price, Each	Weight, Pounds	Price, Each	Weight, Pounds	Price, Each	Weight, Pounds	Price, Each
Front end casting..............	48	$5.00	54	$6.00	187	$12.50	215	$14.00
Rear end casting...............	44	5.00	48	6.00	167	12.50	199	14.00
U-bolts	25	2.00	25	2.10	25	2.00	25	2.10
Lower casting for screw.........	21	3.00	21	3.25	21	3.00	21	3.25
Upper casting for screw.........	16	6.25	16	6.50	16	6.25	16	6.50
Screw	43	7.50	43	7.50	43	7.50	43	7.50
Spring	8	2.75	8	2.75	8	2.75	8	2.75



Union Special Sand Reels

Fig. 59

DESCRIPTION	Weight in Pounds
No. 1.—4"x8' Union Special double drum sand reel with 12x36-inch solid web friction wheel, 36-inch boiler plate flanges and 1½-inch sand reel lever.....	1605
No. 2.—4"x9' Union Special double drum sand reel with 12x42-inch solid web friction wheel, 40-inch boiler plate flanges and 1½-inch sand reel lever......	1917
No. 9.—6"x10' Union Special double drum sand reel with 14x42-inch solid web friction wheel, extra 10x42-inch straight face brake wheel, 40-inch boiler plate flanges and 1½-inch sand reel lever............................	3900

Standard Sand Reels

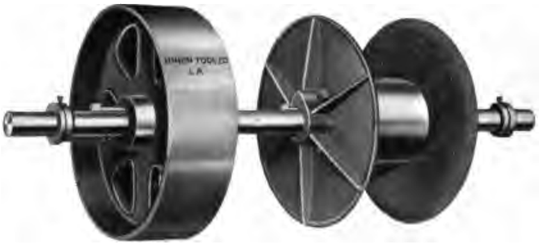


Fig. 60

SINGLE DRUM

DESCRIPTION	Weight in Pounds
No. 6.—4"x8' Standard single drum sand reel with 10x36-inch solid web friction wheel, 36-inch cast iron flanges and 1½-inch sand reel lever............	1396
No. 7.—4"x8' Standard single drum sand reel with 12x36-inch solid web friction wheel, 36-inch cast iron flanges and 1½-inch sand reel lever............	1480
No. 8.—4"x8' Standard single drum sand reel with 12x42-inch solid web friction wheel, 36-inch cast iron flanges and 1½-inch sand reel lever............	1583

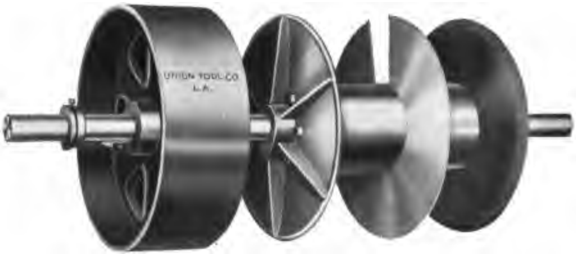


Fig. 61

DOUBLE DRUM

DESCRIPTION	Weight in Pounds
No. 3.—4"x8' Standard double drum sand reel with 10x36-inch solid web friction wheel, 36-inch cast iron flanges and 1½-inch sand reel lever............	1688
No. 4.—4"x8' Standard double drum sand reel with 12x36-inch solid web friction wheel, 36-inch cast iron flanges and 1½-inch sand reel lever............	1753
No. 5.—4"x8' Standard double drum sand reel with 12x42-inch solid web friction wheel, 36-inch cast iron flanges and 1½-inch sand reel lever............	1856

PRICES UPON APPLICATION.

Sand Reel Parts

EXTRA PARTS FOR NO. 1—UNION SPECIAL DOUBLE DRUM SAND REEL

NAME OF PART	Weight in Pounds*
1—Shaft, 4″x8′	305
1—Friction wheel, 12x36 inches	560
2—Outside boiler plate flanges, 36 inches	260
1—Center boiler plate flange, 36 inches	120
1—Drum, 12x16 inches	40
1—Drum, 12x12 inches	30
4—Drum flanges, 11⅝ inches	86
2—Cast iron hubs, 4 inches	102
2—Collars, 4 inches	19
1—Friction key	2¼
2—Outside flange keys	2½
1—Center flange key	¾
6—Bolts, ¾x3½ inches	4½
4—Double end bolts, ¾x34 inches	18
1—Sand reel lever, 1½ inches	55

EXTRA PARTS FOR NO. 2—UNION SPECIAL DOUBLE DRUM SAND REEL

NAME OF PART	Weight in Pounds*
1—Shaft, 4″x9′	344
1—Friction wheel, 12x42 inches	663
2—Outside boiler plate flanges, 40 inches	358
1—Center boiler plate flange, 40 inches	168
2—Drums, 12x18 inches	88
4—Drum flanges, 11⅝ inches	86
2—Cast iron hubs, 4 inches	102
2—Collars, 4 inches	19
1—Friction key	2¼
2—Outside flange keys	2½
1—Center flange key	¾
6—Bolts, ¾x3½ inches	4½
4—Double end bolts, ¾x43 inches	24
1—Sand reel lever, 1½ inches	55

EXTRA PARTS FOR NO. 9—UNION SPECIAL DOUBLE DRUM SAND REEL

NAME OF PART	Weight in Pounds*
1—Shaft, 6″x10′	865
1—Friction wheel, 14x42 inches	897
1—Straight face brake wheel, 10x42 inches	685
2—Outside boiler plate flanges, 40 inches	360
1—Double center boiler plate flange, 40 inches (riveted with ⅜″ rivets)	360
1—Drum, 12x14 inches	35
1—Drum, 12x24 inches	60
4—Drum flanges, 11⅝ inches	88
2—Cast iron hubs, 6 inches	370
2—Collars, 6 inches	54
1—Friction key	2¼
1—Brake wheel key	1¾
2—Outside flange keys	3½
1—Center flange key	1
2—Bolts, ¾x3½ inches	1½
4—Bolts, ¾x7½ inches	5
4—Double end bolts, 1x54 inches	56
1—Sand reel lever, 1½ inches	55

EXTRA PARTS FOR STANDARD SAND REELS

NAME OF PART	Weight in Pounds*
1—Shaft, 4″x8′	305
1—Shaft, 4″x8′ 6″	325
1—Shaft, 4″x9′	344
1—Shaft, 4″x9′ 6″	364
1—Friction wheel, 10x36 inches	495
1—Friction wheel, 12x36 inches	560
1—Friction wheel, 12x42 inches	663
1—Outside cast iron flange, 36 inches	209
1—Center cast iron flange, 36 inches	222
1—Cast iron drum, 14x12 inches	60
1—Cast iron drum, 14x16 inches	81
1—Cast iron drum, 14x20 inches	97
1—Friction key	2¼
1—Outside flange key	1¼
1—Center flange key	1¼
1—Collar, 4 inches	9½
6—Double end bolts, ¾x20 inches	18
6—Double end bolts, ¾x24 inches	21
6—Double end bolts, ¾x33 inches	27
1—Sand reel lever, 1½ inches	55

*Weights shown are for the quantities enumerated in the first column.

Steel Crown Blocks

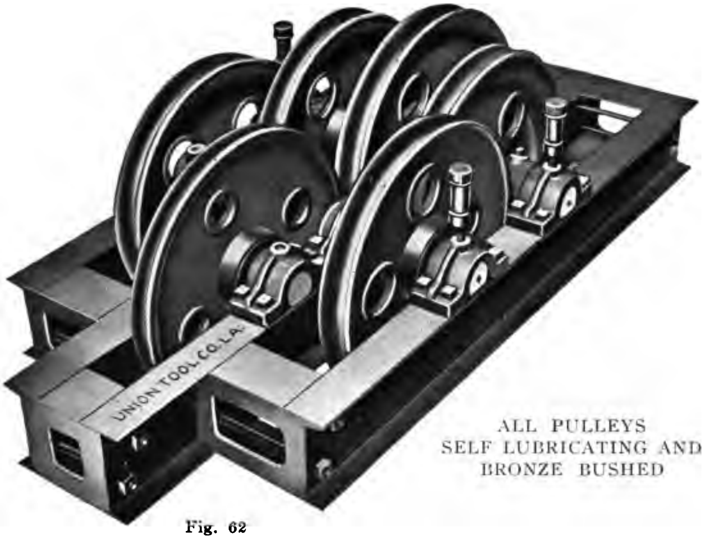


Fig. 62

DESCRIPTION	Weight, Pounds	Price, Each
Ideal—With 1—32-inch crown pulley, 1—30-inch sand line pulley and 4—30-inch casing line pulleys	3470	$500.00
Louthian—With 1—32-inch crown pulley, 1—30-inch sand line pulley and 6—30-inch casing line pulleys	3840	$600.00

PARTS

Number	Number Required	NAME OF PART	Weight, Pounds	Price, Each
G-510	1	32-inch cast iron crown pulley, bronze bushed	310	$41.00
G-508	4	30-inch cast iron casing line pulleys, bronze bushed	265	38.00
G-738	1	30-inch cast iron sand line pulley, bronze bushed	225	33.20
G-509	6	Bronze pulley bushings	10	10.00
G-736	4	Cast iron spacers for I beam, large	40	5.00
G-737	2	Cast iron spacers for I beam, small	35	4.00
G-753	8	Cast iron shaft clamps, single	24	2.70
G-761	2	Cast iron shaft clamps, double	32	3.50
G-511	4	Cast iron collars	18	4.00
1	2	10-inch steel I beams, 8 feet long	240	28.00
2	2	10-inch steel I beams, 7 feet long	210	24.50
3	2	Tie rods for I beam, long	7	1.00
4	4	Tie rods for I beam, medium	3	.60
5	2	Tie rods for I beam, short	2½	.50
6	4	Pulley shafts, long	58	11.50
7	2	Pulley shafts, short	46	10.00
8	6	Pulley shaft pipe plugs	...	.....
9-12	6	Pulley oil cups, complete	2½	1.40
13	8	¼x8½-inch steel washers	2¼	1.50
14	4	¾x1¾-inch collar set screws	¼	.10
15	40	¾x3-inch clamp bolts	¾	.10

Ideal Calf Wheels

(Patented)

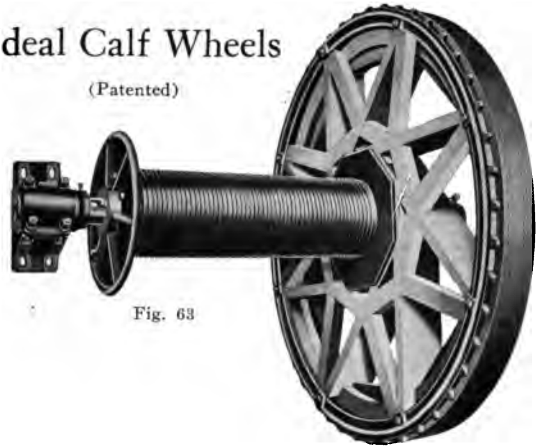
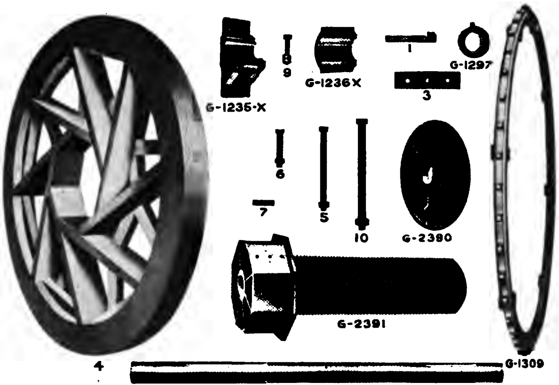


Fig. 63

DESCRIPTION	Weight, Pounds	Price, Each
Ideal calf wheel shaft complete with wood brake wheel and 7-foot sprocket tug rim built on	3616	$250.00



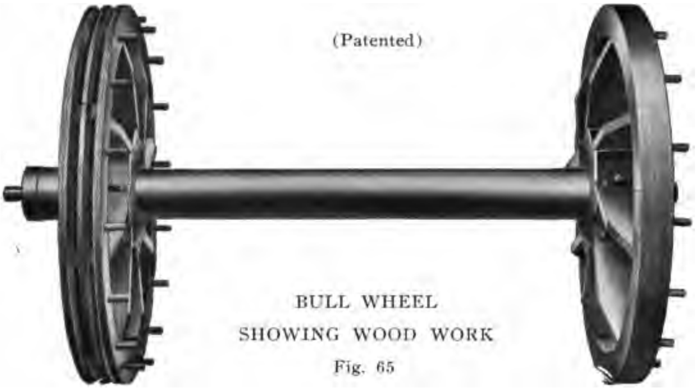
PARTS

Fig. 64

Part Number	Number Required	NAME OF PART	Weight Each, Pounds
G-2391	1	Drum	1495
G-2390	1	Flange	235
G-1309	1	Sprocket tug rim	520
G-1297	2	Set collar	12
G-1235-x	2	Box	115
G-1236-x	2	Cap	36
1	4	Drum and flange key	2
2	1	Shaft	491
3	8	Arm plate	2
4	1	Brake wheel	437
5	8	Sprocket tug rim bolts	2
6	8	Box cap bolts	1¼
7	8	Flange to drum studs	½
9	24	Arm bolts	1
10	8	Box to post bolts	4
		Total weight	3616

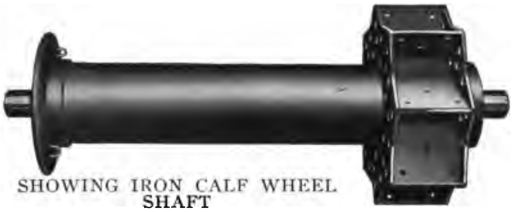
PRICES UPON APPLICATION.

Ross and Seeley Iron Bull and Calf Wheel Shafts


(Patented)

BULL WHEEL
SHOWING WOOD WORK
Fig. 65

These iron bull wheel and calf wheel shafts were designed to replace the troublesome wooden shafts which have long been proven inadequate for handling the heavy strings of pipe and casing now used. They can be lagged with Manila rope if so desired.


SHOWING IRON CALF WHEEL SHAFT
Fig. 66

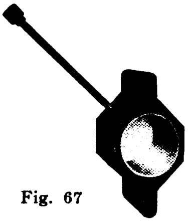


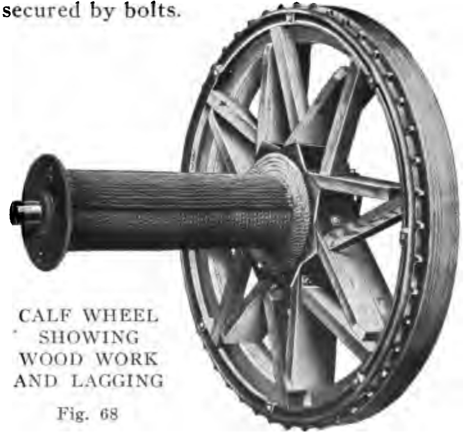
Fig. 67

The hubs are cast in one piece and like the gudgeons are put onto the shafts by hydraulic pressure and additionally secured by bolts.

The wood arms are secured in the channels of the hub by three bolts passing through the arms into iron plates on the opposite side thus preventing them from warping.

Each shaft is furnished with two babbitted boxes. These boxes are diamond shape and are bolted securely into the posts. They are cast in one piece and have one end closed, forming a recess between the end of the journal and the end of the box which prevents the oil, which is fed through an oil pipe into this recess, from coming in contact with the wooden posts.

The calf wheel shafts are filled with cement as a double precaution against their collapsing.


CALF WHEEL
SHOWING
WOOD WORK
AND LAGGING
Fig. 68

DESCRIPTION	Weight, Pounds	Price
Bull wheel shaft complete with bolts, plates and boxes	1555	Upon application
Calf wheel shaft complete with bolts, plates and boxes	1565	Upon application
Extra babbitted boxes with oil pipes, per set of two	73	Upon application

ABOVE WEIGHTS DO NOT INCLUDE WOOD WORK OR LAGGING.

Oil Country Boilers

Standard Horizontal Tubular Boilers

High Pressure Horizontal Tubular Boilers

Boiler Parts

Steam Drilling Engines

Steam Drilling Engine Parts

Pages 25 to 36 Inclusive

Horizontal Tubular Boilers

FAIRBANKS, MORSE & CO'S.
SPECIAL LARGE DOME—OIL COUNTRY PATTERN
40 H. P.

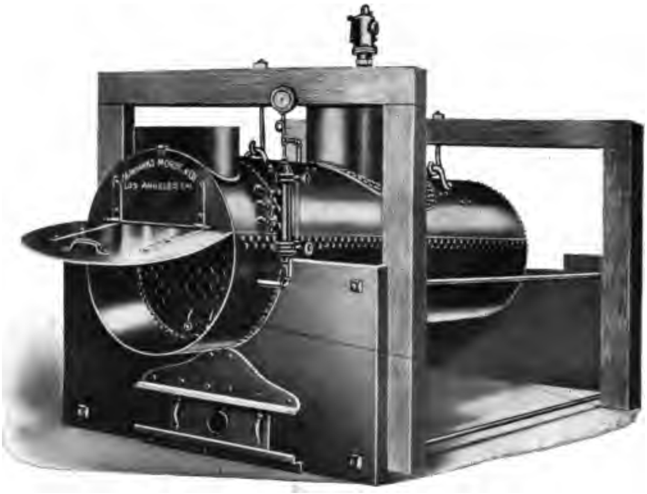


Fig. 69

These Boilers are made of open-hearth flange steel of the best quality, and are built according to our own specifications obtained from experienced oil well men operating in California oil fields and especially designed to meet the demand in the fields where natural adobe is used in place of brick to close in the boiler. Each is provided with two loops and hook bolts for supporting the boiler in a hanging position.

These boilers make steam rapidly and freely, and are easily handled and set up.

SPECIFICATIONS

The shells of these Boilers are made in two sheets, one top and one bottom with the longitudinal seams on the side, giving a clear surface to fire exposure and greatly assisting in cleaning the boiler of scale formation.

The longitudinal seams of the shell and vertical and saddle seams of the dome are double riveted. There is a 9x15-inch manhole in the front head below the tubes and a similar one in the rear head above the tubes.

DIMENSIONS		
Diameter of boiler	inches	46
Length of boiler over all	feet	14
Length of smoke box extension	inches	16
Length of tubes	feet	12
Size of tubes	inches	3
Number of tubes		40
Thickness of shell	inches	$\frac{5}{16}$
Thickness of heads	inches	$\frac{7}{16}$
Diameter of dome	inches	36
Height of dome	inches	30
Thickness of dome shell	inches	$\frac{5}{16}$
Thickness of dome head	inches	$\frac{3}{8}$
Diameter of smoke stack	inches	22
Length of smoke stack	feet	20
Size of steam outlet	inches	3
Size of pop safety valve	inches	3
Size of blow-off valve	inches	2
Weight of boiler bare, about	pounds	5965
Weight of boiler with oil country mud settings, fixtures and fittings	pounds	7700

Horizontal Tubular Boilers

FIXTURES FOR SPECIAL LARGE DOME OIL COUNTRY BOILERS

1—Smokestack, 22" in diameter, 20' long, No. 16 gauge.
80 feet—¼" guy wire.
1—Iron case pop safety valve, 3".
1—Brass steam cock, 2".
1—Black Wrought Iron Nipple, 2"x4".
1—Brass globe valve, 1¼".
1—Brass horizontal check valve, 1¼".
2—Black wrought iron nipples, 1¼"x4".
1—Black wrought iron nipple, 3"x4".
1—Iron case steam gauge, 5"—200 lbs.
1—Steam gauge syphon, ¼".
1—Cast iron water column, No. 2.
3—Register gauge cocks, ½".
1—Set brass water gauges, 2 guard, ½" boiler connections, ⅝"x12" glass.
2—Hook bolts and nuts, 1¾".
2—Plate washers, 6"x6"x⅜"—2" hole.
1—Black malleable beaded tee, 1¼".
1—Black cast iron plug, 1¼".

FOR WATER COLUMN

2 pieces—1¼" black pipe, 14½" long.
1 piece —1¼" black pipe, 10¼" long.
1 piece —1¼" black pipe, 11½" long.
1 piece —1¼" black pipe, 7½" long.
1 piece —1¼" black pipe, 4¾" long.
1 piece —1¼" black pipe, 3¾" long.
1—Black malleable union, 1¼".
3—Black malleable beaded ells, 1¼".

FITTINGS FOR SPECIAL LARGE DOME OIL COUNTRY BOILERS

OIL COUNTRY MUD SETTINGS

1 each—Right and left hand front casting.
1 each—Right and left hand rear casting.
4—Double end rods, ¾"x14'.
1—Curved strap.
1—Straight strap.
2—Doors.
1—Angle iron arch bar rest.
6—Arch bars, 22 inches.

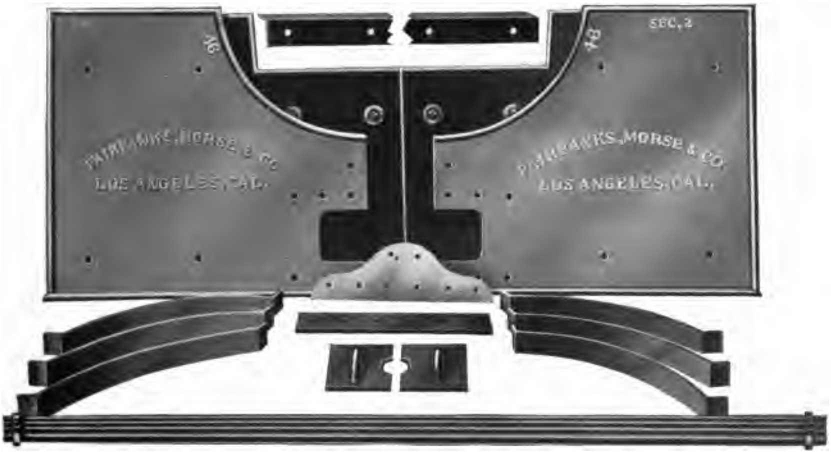


Fig. 70

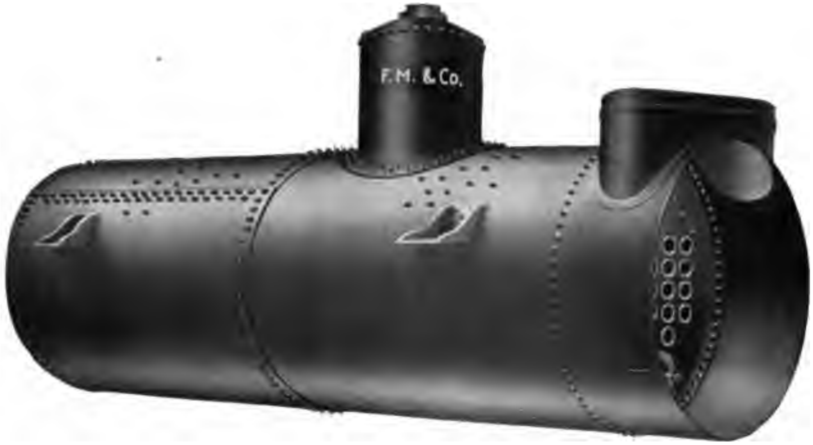


Fig. 71
For Full Front or Half Front as Ordered

Standard Horizontal Tubular Boilers for 100 Pounds Working Pressure

These Boilers are built of open-hearth flange steel of best quality, and are manufactured by the most approved methods. The bracing is of approved form to meet the general requirements; the size and spacing of the rivets are in accordance with the best practice. This type is made with smoke-box extension with uptake, and is suitable for full or half arch setting. Boilers 8 feet long are made in one course; 10 feet to 14 feet long are made in two courses, and Boilers longer than 14 feet are made in three courses. The longitudinal seams of shell are double and the girth seams single riveted. Boilers 36 inches, 40 inches and 44 inches diameter have manhole in rear head above tubes and handhole in front head below tubes. Boilers 48 inches diameter and larger have manhole in rear head above tubes and in front head below tubes. All Boilers are provided with four pressed steel brackets; all flanges 2½ inches and larger are made of pressed steel.

SHEET No. 100 SERIES

REGULAR FIXTURES FOR FULL FRONT

Full Front Anchors and Dead Plate,
*Rear Tee and Angle Bar,
Two Finger Grates and Bearers (see Note),
Rear Soot Door, Frame and Anchors,
Pop Safety Valve,
Steam Gauge and Syphon,
Water Column, Glass Water Gauge and Gauge Cocks,
Check and Globe Valves,
Blow-Off Cock and Whistle,
Smokestack and Guys (four times length of Stack).

SHEET No. 200 SERIES

REGULAR FIXTURES FOR HALF FRONT

Half Front Anchors and Dead Plate,
*Rear Tee and Angle Bar,
Two Finger Grates and Bearers (see Note),
Rear Soot Door, Frame and Anchors,
Pop Safety Valve,
Steam Gauge and Syphon,
Water Column, Glass Water Gauge and Gauge Cocks,
Check and Globe Valves,
Blow-Off Cock and Whistle,
Smokestack and Guys (four times length of Stack).

EXTRAS

Wall Plates and Rollers. Binder Bars and Tie Rods. Fire Door Arch Plates.

NOTE.—Grates up to and including 48 inches long are made in one section, longer are made in two sections and are provided with center bearer. Boilers with domes 28 inches diameter and larger have the flange and vertical seams double riveted.

*Boilers 54 inches diameter and smaller have a rear covering plate instead of rear tee and angle bar.

Specifications for Standard Horizontal Tubular Boilers

FOR 100 LBS. WORKING PRESSURE

Size number	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
Horse power	15	20	25	30	35	40	45	50	60	70	80	100	110	125	150
Diameter of boiler.....inches	36	36	40	40	44	44	48	48	54	54	60	66	66	72	72
Length of tubes.....feet	8	10	10	12	12	14	12	14	14	16	16	16	18	16	18
Diameter of tubes.....inches	3	3	3	3	3	3½	3	3½	3½	4	4	4	4	4	4
Number of tubes	22	24	32	32	40	28	46	34	46	34	44	54	54	70	70
Diameter and height of dome.....inches	18	18	20	20	22	22	24	24	28	28	30	34	34	36	36
Thickness of shell.....inches	¼	¼	¼	¼	¼	¼	¼	¼	5/16	5/16	5/16	⅜	⅜	7/16	7/16
Thickness of tube sheets.....inches	⅜	⅜	⅜	⅜	⅜	⅜	7/16	7/16	7/16	7/16	7/16	7/16	7/16	½	½
Thickness of dome shell.....inches	¼	¼	¼	¼	¼	¼	¼	¼	5/16	5/16	5/16	5/16	5/16	5/16	5/16
Thickness of dome head.....inches	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	⅜	⅜	⅜	⅜	⅜	⅜	⅜
Shipping weight.....pounds	2400	2800	3200	3700	4400	4900	5200	5900	7700	8400	10000	12700	13900	16000	17500

SPECIFICATIONS FOR STANDARD FIXTURES

Diameter of stack.....inches	15	15	18	18	20	20	24	24	26	26	28	32	32	36	36
Length of stack.....feet	24	30	35	35	35	40	40	40	40	45	45	45	50	50	50
Thickness of stack.....gauge	16	16	16	16	16	16	16	16	16	16	14	14	14	12	12
Length of grates.....inches	33	36	36	42	42	48	48	54	48	54	54	54	60	60	66
Width of grates.....inches	30	30	36	36	42	42	42	42	48	48	54	60	60	66	66
Size flange, top of dome.....inches	2	2	2	2½	2½	3	3	3	3½	3½	4	5	5	5	6
Size blow-off.....inches	1¼	1¼	1¼	1¼	1½	1½	1½	1½	2	2	2	2	2	2	2
Size globe and check valve.....inches	¾	¾	¾	¾	1	1	1	1	1¼	1¼	1¼	1½	1½	1½	1½
Size whistle.....inches	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4
Size pop safety valve.....inches	1¼	1¼	1¼	1½	1½	1½	2	2	2½	2½	2½	3	3	3	3

SHIPPING WEIGHTS—BOILER WITH STANDARD FIXTURES—LBS.

Boiler and fixtures, full front	4500	4800	5700	6400	7100	7700	8400	9400	11700	12900	15000	18400	20000	22200	24300
Boiler and fixtures, half front	4250	4550	5300	5900	6400	7100	8000	9000	11100	12300	14200	17800	19300	21500	23600

WEIGHT OF EXTRAS—LBS.

4—wall plates and rollers	140	140	140	140	140	140	140	140	175	175	175	200	200	200	200
4—binder bars and tie rods	400	400	400	400	450	450	500	500	600	600	650	650	650	700	700
1—fire door arch plate, full front	260	260	260	260	260	260	260	260	260	260	360	360	360	360	360
2—fire door arch plates, half front	130	130	130	130	130	130	130	130	130	130	180	180	180	180	180

NOTE—The above specifications apply to either full or half front setting.

Extras are not included in price of boiler and outfit unless so specified.

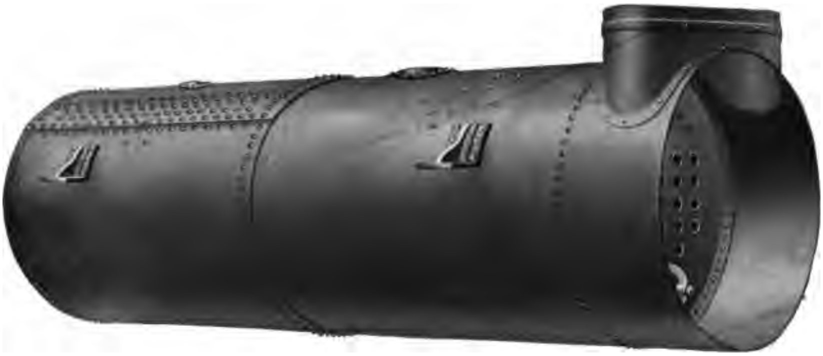


Fig. 72

For Full Front or Half Front as Ordered

Standard High Pressure Horizontal Tubular Boilers for 125 and 150 Pounds Working Pressure

Our High Pressure Boilers are made of open-hearth flange steel of best quality. The longitudinal seam of shell is double butt strapped and triple riveted; the proportions of the joint, spacing, size of rivets, and thickness of straps are in accordance with the best practice of the representative Inspection Companies. The braces for staying the heads are made of pressed steel without welds. These Boilers are made with smoke-box extension and uptake, and are suitable for full or half front setting. Boilers 14 feet long are made in two courses; Boilers longer than 14 feet are made in three courses. All Boilers have pressed manhole in front head under tubes and in rear head over tubes. All flanges 2½ inches and larger are made of pressed steel; all Boilers are provided with four pressed steel brackets.

SHEET No. 300 AND 500 SERIES

REGULAR FIXTURES FOR FULL FRONT

Full Front Anchors and Dead Plate,
*Rear Tee and Angle Bar,
Two Finger Grates and Bearers (see Note),
Rear Soot Door, Frame and Anchors,
Pop Safety Valve,
Steam Gauge and Syphon,
Water Column, Water Gauge and Gauge Cocks,
Check and Globe Valves,
Blow-Off Valve and Whistle,
Smokestack and Guys (four times length of Stack).

SHEET No. 400 AND 600 SERIES

REGULAR FIXTURES FOR HALF FRONT

Half Front Anchors and Dead Plate,
*Rear Tee and Angle Bar,
Two Finger Grates and Bearers (see Note),
Rear Soot Door, Frame and Anchors,
Pop Safety Valve,
Steam Gauge and Syphon,
Water Column, Water Gauge and Gauge Cocks,
Check and Globe Valves,
Blow-Off Valve and Whistle,
Smokestack and Guys (four times length of Stack).

EXTRAS

Wall Plates and Rollers. Binder Bars and Tie Rods. Fire Door Arch Plates.

These Boilers are made without Domes; we can make them with Domes or Dry Pipes, if desired, at an extra cost.

NOTE.—Grates up to and including 48 inches long are made in one section, longer are made in two sections and are provided with center bearer.

*Boilers 54 inches diameter have a rear covering plate instead of rear tee and angle bar.

Specifications for Standard High Pressure Horizontal Tubular Boilers

FOR 125 AND 150 LBS. WORKING PRESSURE

	125-Pound Working Pressure							150-Pound Working Pressure						
Size number	309	310	311	312	313	314	315	509	510	511	512	513	514	515
Horse power	60	70	80	100	110	125	150	60	70	80	100	110	125	150
Diameter of boiler.....inches	54	54	60	66	66	72	72	54	54	60	66	66	72	72
Length of tubes.....feet	14	16	16	16	18	16	18	14	16	16	16	18	16	18
Number of 4-inch tubes.....	34	34	44	54	54	70	70	34	34	44	54	54	70	70
Thickness of shell.....inches	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{11}{32}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{11}{32}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{1}{2}$
Thickness of heads.....inches	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{5}{8}$
Shipping weight.....pounds	7600	8400	10000	12500	13700	15900	17000	8700	9700	11900	14200	15600	18500	20000

SPECIFICATIONS FOR STANDARD FIXTURES

Diameter of stack.....inches	26	26	28	32	32	36	36	26	26	28	32	32	36	36
Length of stack.....feet	40	45	45	45	50	50	50	40	45	45	45	50	50	50
Thickness of stack.....gauge	16	16	14	14	14	12	12	16	16	14	14	14	12	12
Length of grates.....inches	48	54	54	54	60	60	66	48	54	54	54	60	60	66
Width of grates.....inches	48	48	54	60	60	66	66	48	48	54	60	60	66	66
Size steam flange.....inches	3½	3½	4	5	5	5	6	3½	3½	4	5	5	5	6
Size blow-off.....inches	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Size globe and check valve.....inches	1¼	1¼	1¼	1½	1½	1½	1½	1¼	1¼	1¼	1½	1½	1½	1½
Size whistle.....inches	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Size pop safety valve.....inches	2½	2½	2½	3	3	3	3	2½	2½	2½	3	3	3	3

SHIPPING WEIGHTS—BOILER WITH STANDARD FIXTURES—LBS.

Boiler and fixtures, full front.....	11600	12900	15000	19400	19800	22100	23800	12700	14200	16900	19900	21700	24700	26800
Boiler and fixtures, half front.....	11000	12300	14200	18800	19100	21400	23100	12100	13600	16100	19300	21000	24000	26100

WEIGHT OF EXTRAS—LBS.

Wall plates and rollers.....	175	175	175	200	200	200	200	175	175	175	200	200	200	200
Binder bars and tie rods.....	600	600	650	650	650	700	700	600	600	650	650	650	700	700
1—Fire door arch plate, full front.....	360	360	360	360	360	360	360	360	360	360	360	360	360	360
2—Fire door arch plates, half front.....	180	180	180	180	180	180	180	180	180	180	180	180	180	180

Extras are not included in price of boiler and outfit unless so specified.

Titan Drilling Engines

SLIDE VALVE

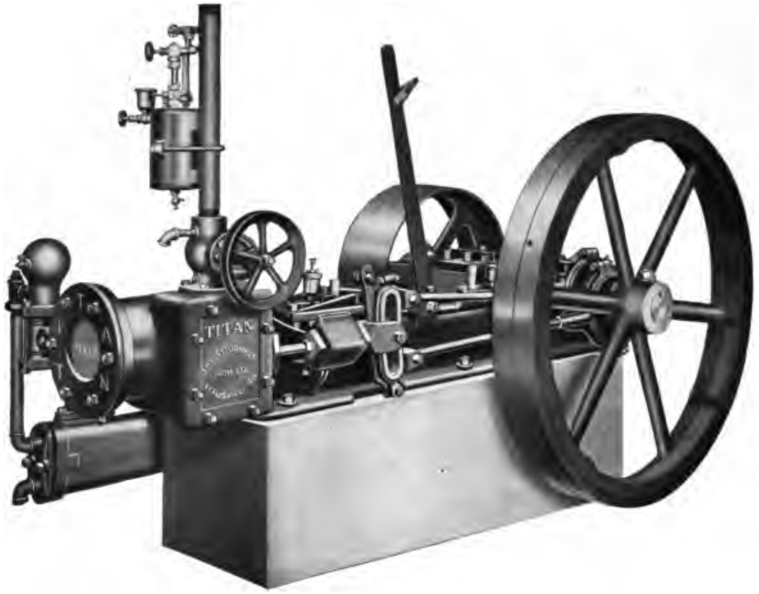


Fig. 73

This Engine is especially designed for deep well drilling and pumping, and is extensively used both for artesian wells and throughout the various oil regions of the country. It is a "Rigid Reverse" Engine, being controlled by a string of rods running from the engine house to the derrick, by means of which the link is lifted up or pushed down, reversing instantly, or is held up at any point desired.

The fly wheel is sectional, having extra balance rings to be added as needed. The large sizes are of ample power for drilling the deepest oil or artesian wells. The cranks are forged from solid steel billets. The connecting rod brasses are of the best quality of phosphor bronze. Only the best of materials are used in construction throughout.

Rated H. P.	Diameter of Cylinder and Stroke, Inches	Length of Bed, Inches	Width of Bed, Inches	Diameter of Crank-shaft, Inches	Bore of Pulley and Balance Wheel, Inches	Diameter of Pulley, Inches	Face of Pulley, Inches	Diameter of Balance Wheel, Inches	Weight Complete, Pounds	Weight Stripped, Pounds
15	9 x12	72½	19	3½	3½	30	10½	54½	3194	2522
23	10½x12	75	20¾	3⅞	3⅞	30	12½	60	3980	3088
30	12 x12	75½	22	4	4	30	12½	60	4337	3447

The power as rated above is very much less than actual. When speeded up the Engines develop nearly twice the rated horse power.

The "Complete" Engine includes pump, heater and extra balance rings.

The "Stripped" Engine is without pump, heater and all balance rings.

PRICES UPON APPLICATION.

PARTS OF THE TITAN SLIDE VALVE DRILLING ENGINE

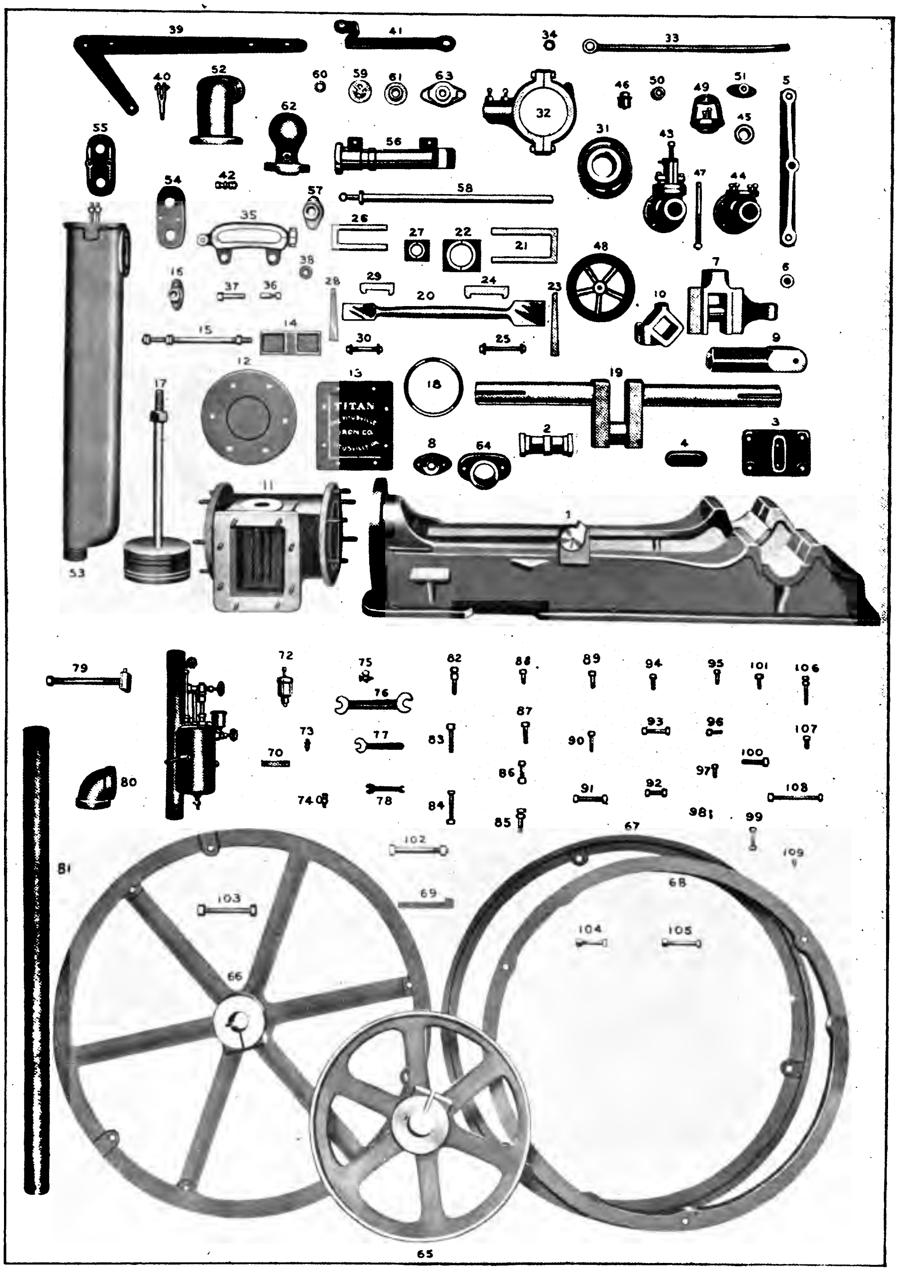


Fig. 74

Parts of the Titan Slide Valve Drilling Engine

Part Number	NAME OF PART	Size of Engine		
		9x12	10½x12	12x12
1	Frame with caps each	$55.00	$62.00	$65.00
2	Quarter boxes babbitted “	1.50	1.50	1.50
3	Bearing caps “	2.00	2.00	2.00
4	Oil cup covers “	.20*	.20*	.20*
5	Top guides “	3.00	3.00	3.00
6	Distance blocks “	.25	.50*	.50*
7	Crosshead babbitted “	7.00	8.00	8.00
8	Piston rod gland “	1.00	1.00*	1.00*
9	Valve stem slide “	3.50	3.50*	3.50*
10	Valve stem stand “	3.50*	3.50*	3.50*
11	Cylinder studded “	36.00	39.00	41.00
12	Cylinder head “	4.00	4.50	4.50
13	Steam chest cover “	3.25	3.75	3.75
14	Slide valve “	3.25	3.75	3.75
15	Valve stem with nuts “	2.25	2.75*	2.75*
16	Valve stem gland “	1.00	1.00*	1.00*
17	Piston with rod and nut “	11.00	11.50	11.50
18	Piston rings (2 in a set) “	2.00	2.00	2.00
19	Crank shaft “	40.00	48.00	52.00
20	Connecting rod bare “	12.00	13.00	13.00
21	Straps for crank end “	4.50	4.50	4.50
22	Brasses for crank end “	8.50	9.00	9.00
23	Key for crank end “	1.00	1.00	1.00
24	Gib for crank end “	1.00	1.00	1.00
25	Bolt for crank end “	.50	.50	.50
26	Strap for crosshead end “	4.00	4.00	4.00
27	Brasses for crosshead end “	6.50	6.50	6.50
28	Key for crosshead end “	1.00	1.00	1.00
29	Gib for crosshead end “	1.00	1.00	1.00
30	Bolt for crosshead end “	.50	.50	.50
31	Eccentric hub “	4.00	5.00	5.00
32	Eccentric straps “	4.00	4.00*	4.00*
33	Eccentric rod and bushing “	3.00	3.00	3.00
34	Eccentric rod bushing “	.50*	.50*	.50*
35	Reverse link with wrist pins “	7.50	8.00*	8.00*
36	Wrist pin “	.50*	.50*	.50*
37	Link pin “	.50*	.50*	.50*
38	Link roller “	.50	.50*	.50*
39	Reverse lever “	3.50*	3.50*	3.50*
40	Connection head “	.35*	.35*	.35
41	Drop hanger “	1.25	1.25	1.25
42	Drop hanger pin “	.50*	.50*	.50*
43	Throttle valve, complete “	10.00*	10.00*	10.00
44	Throttle valve shell “	5.50*	5.50*	5.50
45	Throttle valve seat “	.50*	.50*	.50
46	Throttle valve for seat “	.50*	.50*	.50
47	Throttle valve stem “	1.25*	1.25*	1.25
48	Throttle valve rope wheel “	.50*	.50*	.50*
49	Throttle valve yoke “	2.00*	2.00*	2.00
50	Throttle valve stem nut “	.50	.50	.50
51	Throttle valve stem gland “	.35*	.35*	.35*
52	Heater goose neck “	2.50*	2.50*	2.50
53	Heater shell “	7.50*	7.50*	7.50
54	Heater inner end plate “	.75*	.75*	.75
55	Heater outer end plate “	.75*	.75*	.75
56	Pump barrel “	4.50	4.50*	4.50*
57	Pump gland “	1.00	1.00*	1.00*

Items followed by an asterisk (*) interchange with sizes so marked.

Items followed by no asterisk (*) are not interchangeable.

IN ORDERING PARTS, ALWAYS GIVE THE SIZE (NOT THE HORSE POWER), AND, IF POSSIBLE, THE NUMBER OF THE ENGINE.

Parts of the Titan Slide Valve Drilling Engine

Part Number	NAME OF PART		SIZE OF ENGINE		
			9x12	10½x12	12x12
58	Pump plunger and nut	each	$3.00	$3.00*	$3.00*
59	Pump valve cages	“	.75*	.75*	.75*
60	Pump valves	“	.50*	.50*	.50*
61	Pump valve seats	“	.75*	.75*	.75*
62	Air chamber	“	1.75*	1.75*	1.75*
63	Pump bottom	“	.75*	.75*	.75*
64	Exhaust nozzle (for stripped engine)	“	.75*	.75*	.75
65	Belt pulley	“	18.00	18.00	20.00
66	Fly wheel bare	“	27.00	27.00	27.00
67	First rim for fly wheel	“	10.00	10.00*	10.00*
68	Second rim for fly wheel	“	10.00	10.00*	10.00*
69	Fly wheel and pulley keys	“	.75*	.75*	.75*
70	Eccentric hub key	“	.50*	.50*	.50*
71	Sight feed lubricator	“	11.00*	11.00*	11.00*
72	Grease cup for connecting rod	“	.65	.80	.80
73	Oil cups for eccentric straps	“	.15*	.15*	.15*
74	Air cocks for cylinder, ⅜-inch	“	.35*	.35*	.35*
75	Air cocks for pump, ¼-inch	“	.25*	.25*	.25*
76	Wrench for ⅝ and ¾-inch U. S. S. nuts	“	.50*	.50*	.50*
77	Wrench for ½-inch U. S. S. nuts	“	.25*	.25*	.25*
78	Wrench for ⅜ and ⅝-inch set screws	“	.30*	.30*	.30*
79	Foundation bolts and nuts	“	.30*	.30*	.30*
80	Casing elbow for heater	“	.75*	.75*	.75
81	Exhaust pipe	“	2.00*	2.00*	2.50
82	Studs and nuts for bearing caps	“	.25	.25*	.25*
83	Studs and nuts for guides	“	.25	.25	.25
84	Bolts and nuts for piston gland	“	.20	.20*	.20*
85	Stud and nuts for reverse lever	“	.20*	.20*	.20*
86	Bolt and nut for lever stop	“	.15*	.15*	.15*
87	Studs and nuts, cylinder to frame	“	.20	.20	.20
88	Studs and nuts, cylinder to head	“	.20*	.20*	.20*
89	Studs and nuts, steam chest cover	“	.20*	.20*	.20*
90	Studs and nuts, steam chest gland	“	.20*	.20*	.20*
91	Bolts and nuts, valve stem stand to frame	“	.20*	.20*	.20*
92	Bolts and nuts, for drop hanger	“	.20*	.20*	.20*
93	Bolts and nuts, for eccentric straps	“	.20	.20*	.20*
94	Set screws for eccentric straps	“	.10*	.10*	.10*
95	Studs and nuts for throttle valve yoke	“	.20*	.20*	.20*
96	Studs and nuts for throttle valve gland	“	.20*	.20*	.20*
97	Tap bolts for throttle valve to cylinder	“	.20*	.20*	.20
98	Set screw for throttle valve nut	“	.10*	.10*	.10*
99	Bolts and nuts, goose neck to cylinder	“	.10*	.10*	.10
100	Studs and nuts, end plate to shell	“	.10*	.10*	.10
101	Tap bolts, goose neck to heater	“	.10*	.10*	.10
102	Bolt and nut for pulley	“	.50	.50	.50
103	Bolts and nuts for fly wheel	“	.50	.50*	.50*
104	Bolts and nuts, first rim to fly wheel	“	.25	.25*	.25*
105	Bolts and nuts, extra rim to fly wheel	“	.25	.25*	.25*
106	Studs and nuts for pump gland	“	.20*	.20*	.20*
107	Tap bolts, pump to cylinder	“	.10*	.10*	.10*
108	Bolts and nuts, pump bottom to air chamber	“	.15*	.15*	.15*
109	Set screws for connecting rods	“	.10	.10	.10

Items followed by an asterisk (*) interchange with sizes so marked.

Items followed by no asterisk (*) are not interchangeable.

IN ORDERING PARTS, ALWAYS GIVE THE SIZE (NOT THE HORSE POWER), AND, IF POSSIBLE, THE NUMBER OF THE ENGINE.

Page Adjustable Engine Pumps

CAN BE FITTED TO ANY MAKE OR SIZE OF OIL COUNTRY ENGINE

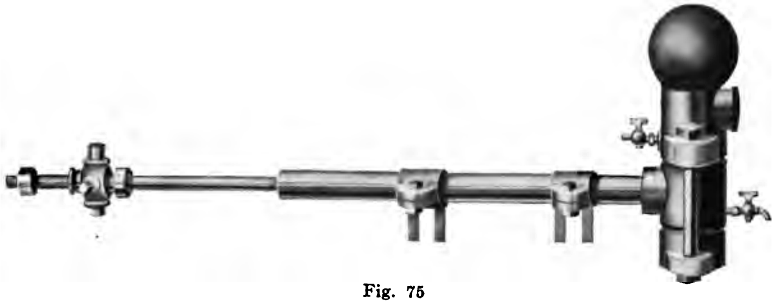


Fig. 75

WEIGHT, 50 POUNDS

Complete ....each $28.00

PARTS

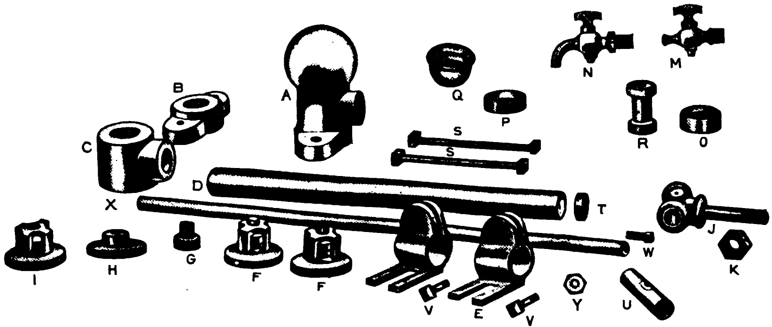


Fig. 76

Symbol	NAME OF PART	Price	Symbol	NAME OF PART	Price
A	Air chamber ....each	$4.00	O	Screw ring for plunger...each	$0.80
B	Bottom .... "	4.00	P	Shoulder ring for plunger. "	.60
C	Center .... "	4.00	Q	Cups, per set of two..........	.40
D	Barrel (brass) .... "	4.00	R	Sleeve for plunger........each	.80
E	Clamps, per set of two........	4.00	S	Pump bolts .... "	.20
F	Valves, per set of two........	7.00	T	Cup gauge .... "	.20
G	Valve only ....each	1.00	U	Pin for adjustable head... "	.50
H	Valve seat only........... "	1.50	V	Clamp bolts .... "	.10
I	Valve crown only......... "	1.50	W	Screw for head........... "	.10
J	Adjustable plunger head .. "	1.50	X	Plunger rod .... "	1.20
K	Nut, crosshead end........ "	.40	Y	Nut, cup end............ "	.30
M N	Air cocks .... "	.50			

Drilling Tools

Pages 37 to 63 Inclusive

Fishing Tools

Pages 64 to 75 Inclusive

Drilling Tools

FOR CABLE SYSTEM

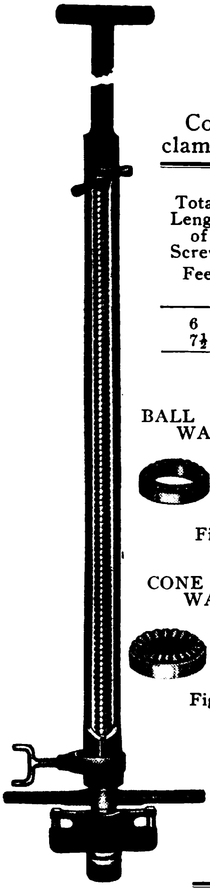
TEMPER SCREWS—EXTRA HEAVY PATTERN

Ball Bearing Washers Top and Bottom

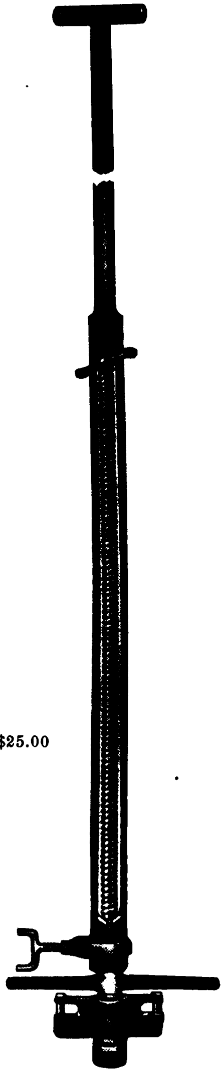
Complete with one set of wire rope or manila rope clamps.

Total Length of Screw, Feet	To Let Out, Feet	Regular Pattern				Long Frame Pattern	
		Diameter of Screw				Diameter of Screw	
		1¾"		2"		2"	
		Weight, Pounds	Price, Each	Weight, Pounds	Price, Each	Weight, Pounds	Price, Each
6	4 7/12	351	$61.50	.....	....	....	....
7½	5 10/12	.....	....	410	$70.50	430	$73.00

Above weights are for temper screws with wire rope clamps.



Extra Heavy Regular Pattern, Less Rope Clamps. Fig. 77



Extra Heavy Long Frame Pattern, Less Rope Clamps. Fig. 78

BALL BEARING WASHER

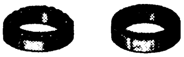


Fig. 81

CONE BEARING WASHER

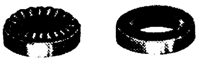


Fig. 82

TEMPER SCREW ROPE CLAMPS

LINKS, CLAMPS, C AND C SCREW WITH HANDLE.

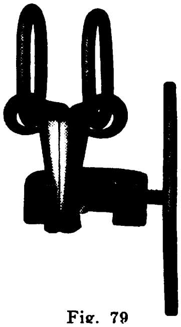


Fig. 79
For Manila Rope.
Weight, 115 lbs. Price...$25.00

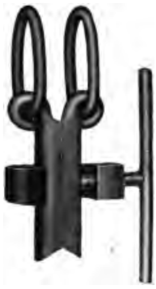


Fig. 80
For Wire Rope.
Weight, 150 lbs. Price...$25.00

TEMPER SCREW PARTS

PARTS		Regular Pattern		Long Frame Pattern
For size screw.........................	inches	1¾	2	2
Frame with tee for 6-foot screw........	each	$17.50	....	....
Frame with tee for 7½-foot screw........	“	....	$26.00	$28.50
Main screw, 6 feet long...............	“	8.00	....	....
Main screw, 7½ feet long..............	“	....	13.50	13.50
Nut for main screw	“	.15	.15	.15
Upper ball bearing washers complete....	“	1.00	1.00	1.00
Balls only for upper washer...........	“	.03	.03	.03
Lower ball bearing washers complete....	“	4.25	5.00	5.00
Balls only for lower washer...........	“	.05	.05	.05
Lower cone bearing washers complete...	“	4.75	5.50	5.50
Cones only for lower washer..........	“	.15	.15	.15
Elevator for main screw	“	3.00	3.00	3.00
Yoke complete	“	4.50	5.25	5.25
Tee screw for yoke	“	3.00	3.00	3.00
Yoke set screw	“	.15	.15	.15
Cross bar	“	5.00	5.00	5.00
Cross bar set screw..................	“	.15	.15	.15
Swivel	“.	8.25	8.25	8.25
Link seat caps	“	.15	.15	.15
Link seat set screw for caps...........	“	.10	.10	.10
Clamp links	per pair	8.00	8.00	8.00
Rope clamps	“	9.00	9.00	9.00
C only	each	13.00	13.00	13.00
C screw with handle	“	10.00	10.00	10.00

Drilling Tools

FOR CABLE SYSTEM

NEW ERA ROPE SOCKETS

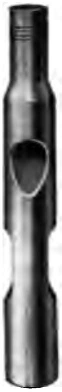


Fig. 83

The rope is passed through the tapered hole in the side, is knotted, and when drawn up, wedges securely.

Size of Box, Inches	Threads Per Inch	Weight, Pounds	Price, Each
1¾x2¾	8	75	$15.00
2 x3	7	100	16.25
2¼x3¼	7	125	17.50
2½x3½	7	150	18.75
2¾x3¾	7	175	23.25
3 x4	7	200	25.00
3¼x4¼	7	250	28.25
3½x4½	7	275	30.00
4 x5	7	300	32.50

SOLID WIRE ROPE SOCKETS

The cable is passed through opening and babbitted in taper seat.

Size of Box, Inches	Threads Per Inch	Weight, Pounds	Price, Each
1⅝x2½	8	35	$ 9.50
1¾x2¾	8	40	10.00
2 x3	7	50	10.75
2¼x3¼	7	60	14.00
2½x3½	7	75	14.50
2¾x3¾	7	85	15.00
3 x4	7	100	15.50
3¼x4¼	7	140	20.00

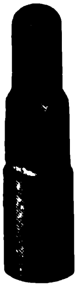


Fig. 84

K. A. K. RATCHET WIRE ROPE SOCKETS

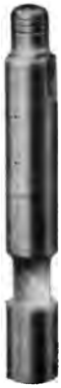


Fig. 85

This rope socket was designed to impart to the drilling tools a rotary motion so that the drilling bit will strike in a different position on every stroke of the walking beam, insuring a hole that will be straight, round and perfect.

It will turn the tools in any kind of formation, and will drill holes straighter and faster than any other make of socket.

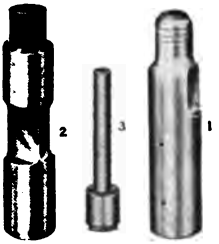


Fig. 86

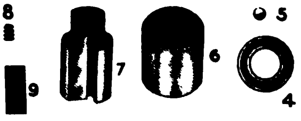


Fig. 87

1—Sub
2—Body
3—Mandrel
4—Ball race
5—Balls
6—Ratchet sleeve
7—Pawl hub
8—Spring
9—Pawl

Size of Box, Inches	Threads Per Inch	Weight, Pounds	Price, Each	Size of Box, Inches	Threads Per Inch	Weight, Pounds	Price, Each
1⅝x2½	8	100	$65.00	2½x3½	7	245	$ 85.00
1¾x2¾	8	100	65.00	2¾x3¾	7	310	100.00
2 x3	7	145	75.00	3 x4	7	310	100.00
2¼x3¼	7	245	85.00	4 x5	7	410	125.00

Drilling Tools

FOR CABLE SYSTEM

DRILLING AND FISHING JARS

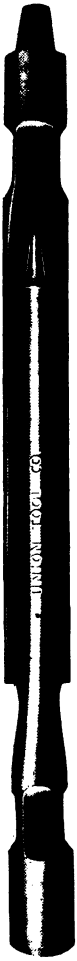


Fig. 88

Diameter, Inches	3¾		4		4¼		4½		4¾	
Size Box and Pin, Inches	1¾x2¾—8		1¾x2¾—8		1¾x2¾—8		2x3—7		2x3—7	
Stroke, Inches	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each
4	150	$40.50	160	$43.00	180	$44.50	260	$46.50	280	$48.50
6	154	42.00	165	44.50	185	46.50	267	48.00	288	50.00
8	158	43.50	170	46.00	191	48.00	275	50.00	296	51.50
10	162	45.00	175	47.50	196	49.50	282	51.50	304	53.50
12	166	46.50	180	49.00	202	51.00	290	53.00	312	55.00
14	170	48.00	185	50.50	207	52.50	297	54.50	320	56.50
16	174	49.50	190	52.00	213	54.00	305	56.00	328	58.00
18	178	51.00	195	53.50	218	55.50	312	58.00	336	60.00
20	182	52.50	200	55.00	224	57.50	320	59.50	344	61.50
22	186	54.00	205	56.50	229	59.00	327	61.00	352	63.00
24	190	55.50	210	58.00	235	60.50	335	62.50	360	65.00
26	194	57.00	215	59.50	240	62.00	342	64.00	368	66.50
28	198	58.50	220	61.00	246	63.50	350	66.00	376	68.00
30	202	60.00	225	62.50	251	65.00	357	67.50	384	70.00
32	206	61.50	230	64.00	267	66.50	365	69.00	392	71.50
34	210	63.00	235	65.50	272	68.00	372	71.00	400	73.00
36	214	64.50	240	67.00	278	70.00	380	72.50	408	75.00
38	218	66.00	245	68.50	283	71.50	387	74.00	416	76.50
40	222	67.50	250	70.00	289	73.00	395	76.00	424	78.00
42	226	69.00	255	71.50	294	75.00	402	77.50	432	80.00
44	230	70.50	260	73.00	300	76.50	410	79.00	440	81.50
46	235	72.00	265	74.50	305	78.00	417	81.00	450	83.00
48	240	73.50	270	76.00	310	79.50	425	82.50	460	85.00

Diameter, Inches	5		5¼		5½		6		6¼	
Size Box and Pin, Inches	2x3—7		2x3—7		2¼x3¼—7		2¾x3¾—7		3x4—7	
Stroke, Inches	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each
4	300	$50.00	325	$52.25	420	$56.00	475	$63.25	500	$67.00
6	309	52.00	334	54.00	429	58.00	485	66.00	511	69.75
8	318	53.50	343	55.75	438	60.00	495	68.50	523	72.50
10	327	55.50	352	57.50	447	62.00	505	71.00	534	75.25
12	336	57.00	361	59.25	456	64.00	515	73.25	546	78.00
14	345	59.00	370	61.00	465	66.00	525	76.00	557	80.75
16	354	60.50	379	62.75	474	68.00	535	78.50	568	83.50
18	363	62.00	388	64.50	483	70.00	545	81.00	580	86.25
20	372	64.00	397	66.25	492	72.00	555	83.25	591	89.00
22	381	65.50	406	68.00	502	74.00	565	86.00	603	91.75
24	390	67.00	415	69.75	511	76.00	575	88.50	614	94.50
26	400	69.00	424	71.50	520	78.00	585	91.00	625	97.25
28	409	70.50	433	73.25	530	80.00	595	93.25	637	100.00
30	418	72.50	442	75.00	539	82.00	605	96.00	648	102.75
32	427	74.00	451	76.75	548	84.00	615	98.25	660	105.50
34	436	76.00	460	78.50	557	86.00	625	101.00	671	108.25
36	445	77.50	469	80.25	566	88.00	635	103.25	682	111.00
38	454	79.00	478	82.00	575	90.00	645	106.00	694	113.75
40	463	81.00	487	83.75	584	92.00	655	108.25	705	116.50
42	472	82.50	496	85.50	593	94.00	665	111.00	717	119.25
44	480	84.50	505	87.25	602	96.00	675	113.25	728	122.00
46	490	86.00	515	89.00	611	98.00	685	116.00	739	124.75
48	500	87.50	525	91.00	620	100.00	695	118.50	750	127.50

When ordering, state size of box and pin; style of taper; number of threads to the inch (flat or sharp); size of wrench square; also diameter of hole in which tool is to be used.

Drilling Tools

FOR CABLE SYSTEM

SINKER BARS AND AUGER STEMS

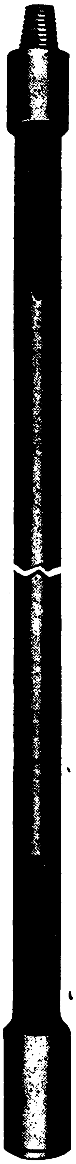


Fig. 89

Diameter, Inches	3		3¼		3½		3¾	
Size Box and Pin, Inches	1⅝x2½—8		1⅝x2½—8		2x3—7		2x3—7	
Length, Feet	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each
6	167	$25.75	180	$26.25	240	$31.00	252	$31.75
8	215	28.00	236	28.75	305	33.75	328	34.75
10	260	30.00	292	31.25	370	36.75	402	38.25
12	308	32.00	348	33.75	437	39.75	477	41.25
14	356	34.25	404	36.25	503	42.50	552	44.75
16	404	36.25	461	38.75	569	45.50	627	48.00
18	455	38.25	518	41.25	635	48.25	702	51.25
20	503	40.50	575	43.75	700	51.00	777	54.50
22	552	42.50	630	46.25	767	54.25	852	58.00
24	600	44.75	687	48.75	833	57.00	927	61.00
26	648	46.75	743	51.25	900	59.75	1002	64.50
28	696	48.75	800	53.75	966	62.50	1077	67.50
30	744	51.00	856	56.25	1032	65.75	1152	71.00
32	792	59.50	913	65.00	1097	74.75	1227	80.50
Diameter, Inches	4		4¼		4½		5	
Size Box and Pin, Inches	2¾x3¾—7		2¾x3¾—7		3x4—7		4x5—7	
Length, Feet	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each
6	360	$37.50	375	$38.25	427	$43.00	600	$62.00
8	446	41.25	470	42.25	535	47.50	740	67.50
10	532	45.00	568	46.75	643	52.25	875	73.50
12	618	48.75	664	50.75	750	57.00	1000	79.50
14	704	52.50	761	55.00	860	62.00	1140	85.00
16	790	56.25	857	59.25	967	66.75	1275	91.00
18	876	60.00	954	63.50	1075	71.25	1400	97.00
20	962	63.75	1050	67.50	1183	76.00	1550	102.50
22	1048	67.50	1147	72.00	1290	80.75	1680	108.50
24	1134	71.25	1243	76.25	1400	85.50	1800	114.50
26	1220	75.00	1340	80.50	1507	90.00	1950	120.50
28	1306	78.75	1436	84.50	1615	94.75	2080	126.00
30	1392	82.50	1533	88.75	1723	99.75	2200	132.00
32	1478	92.50	1630	99.50	1830	110.75	2350	147.25

When ordering, state size of box and pin; style of taper; number of threads to the inch (flat or sharp); size of wrench square; also diameter of hole in which tool is to be used.

ADDITIONS AND DEDUCTIONS

Amount to be added or deducted from the list on sinker bars, auger stems and jars for joints other than shown.

For a larger joint add the amount and weight.

For a smaller joint deduct the amount and weight.

SIZE JOINTS	Applying Only to List on Sinker Bars and Auger Stems		Applying Only to List on Drilling and Fishing Jars	
	For Box and Pin Joints	Weight, Pounds	For Box and Pin Joints	Weight, Pounds
1⅝x2½—8 to 1¾x2¾—8	$1.50	20	$1.25	20
1¾x2¾—8 to 2 x3 —7	3.25	25	2.50	25
2 x3 —7 to 2¼x3¼—7	1.50	20	1.25	20
2 x3 —7 to 2½x3½—7	3.25	50	2.50	50
2¼x3¼—7 to 2½x3½—7	1.50	30	1.25	30
2¼x3¼—7 to 2¾x3¾—7	4.75	60	3.75	60
2½x3½—7 to 2¾x3¾—7	3.25	30	2.50	30
2½x3½—7 to 3 x4 —7	7.75	75	6.25	75
2¾x3¾—7 to 3 x4 —7	4.75	45	3.75	45
2¾x3¾—7 to 3¼x4¼—7	9.50	130	7.50	130
3 x4 —7 to 3¼x4¼—7	4.75	85	3.75	85
3 x4 —7 to 3½x4½—7	9.00	105	7.25	105
3 x4 —7 to 4 x5 —7	12.50	205	10.00	205
3¼x4¼—7 to 4 x5 —7	8.25	120	6.50	120
3½x4½—7 to 4 x5 —7	3.50	100	2.75	100

Drilling Tools

FOR CABLE SYSTEM

ALL STEEL DRILLING BITS

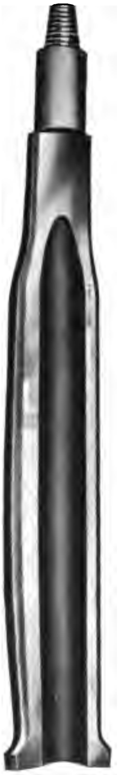


Fig. 90

Size Hole, Inches	L'gth Feet	Size Pin, Inches	Thr'ds Per Inch	Wt., Lbs.	Size Hole, Inches	L'gth Feet	Size Pin, Inches	Thr'ds Per Inch	Wt., Lbs.
4½	5	1⅝x2½	8	135	8¼	5½	3 x4	7	460
4½	5½	1⅝x2½	8	150	8¼	6	3 x4	7	500
4½	6	1⅝x2½	8	165	8¼	6½	3 x4	7	540
4½	5	1¾x2¾	8	145	9⅝	5½	2 x3	7	505
4½	5½	1¾x2¾	8	160	9⅝	6	2 x3	7	560
4½	6	1¾x2¾	8	175	9⅝	5½	2¼x3¼	7	515
5	5	2 x3	7	190	9⅝	6	2¼x3¼	7	570
5	5½	2 x3	7	210	9⅝	5½	2½x3½	7	530
5	6	2 x3	7	230	9⅝	6	2½x3½	7	585
5	5	2¼x3¼	7	200	9⅝	5½	2¾x3¾	7	545
5	5½	2¼x3¼	7	220	9⅝	6	2¾x3¾	7	600
5	6	2¼x3¼	7	240	9⅝	5½	3 x4	7	570
5⅝	5	2 x3	7	220	9⅝	6	3 x4	7	625
5⅝	5½	2 x3	7	245	9⅝	6½	3 x4	7	675
5⅝	6	2 x3	7	265	10	5½	2 x3	7	535
5⅝	5	2¼x3¼	7	230	10	6	2 x3	7	585
5⅝	5½	2¼x3¼	7	255	10	5½	2¼x3¼	7	545
5⅝	6	2¼x3¼	7	275	10	6	2¼x3¼	7	595
6	5	2 x3	7	250	10	5½	2½x3½	7	560
6	5½	2 x3	7	275	10	6	2½x3½	7	610
6	6	2 x3	7	300	10	5½	2¾x3¾	7	575
6	5	2¼x3¼	7	260	10	6	2¾x3¾	7	625
6	5½	2¼x3¼	7	285	10	5½	3 x4	7	600
6	6	2¼x3¼	7	310	10	6	3 x4	7	650
6⅝	5	2 x3	7	270	10	6½	3 x4	7	700
6⅝	5½	2 x3	7	300	11⅝	5½	2½x3½	7	645
6⅝	6	2 x3	7	325	11⅝	6	2½x3½	7	710
6⅝	5	2¼x3¼	7	280	11⅝	5½	2¾x3¾	7	660
6⅝	5½	2¼x3¼	7	310	11⅝	6	2¾x3¾	7	725
6⅝	6	2¼x3¼	7	335	11⅝	6½	2¾x3¾	7	785
6⅝	5	2½x3½	7	295	11⅝	5½	3 x4	7	685
6⅝	5½	2½x3½	7	325	11⅝	6	3 x4	7	750
6⅝	6	2½x3½	7	350	11⅝	6½	3 x4	7	810
7⅝	5½	2 x3	7	375	11⅝	5½	3¼x4¼	7	725
7⅝	6	2 x3	7	405	11⅝	6	3¼x4¼	7	790
7⅝	5½	2¼x3¼	7	385	11⅝	6½	3¼x4¼	7	850
7⅝	6	2¼x3¼	7	415	12½	5½	2¾x3¾	7	775
7⅝	5½	2½x3½	7	400	12½	6	2¾x3¾	7	850
7⅝	6	2½x3½	7	430	12½	6½	2¾x3¾	7	925
7⅝	5½	2¾x3¾	7	415	12½	5½	3 x4	7	800
7⅝	6	2¾x3¾	7	445	12½	6	3 x4	7	875
7⅝	5½	3 x4	7	440	12½	6½	3 x4	7	950
7⅝	6	3 x4	7	470	12½	5½	3¼x4¼	7	840
8¼	5½	2 x3	7	395	12½	6	3¼x4¼	7	915
8¼	6	2 x3	7	435	12½	6½	3¼x4¼	7	990
8¼	5½	2¼x3¼	7	405	12½	5½	3½x4½	7	850
8¼	6	2¼x3¼	7	445	12½	6	3½x4½	7	925
8¼	5½	2½x3½	7	420	12½	6½	3½x4½	7	1000
8¼	6	2½x3½	7	510	12½	5½	4 x5	7	900
8¼	5½	2¾x3¾	7	435	12½	6	4 x5	7	975
8¼	6	2¾x3¾	7	475	12½	6½	4 x5	7	1050

When ordering, state size of pin; style of taper; number of threads to the inch (flat or sharp); size of wrench square; also diameter of the hole in which tool is to be used.

ALL STEEL DRILLING BITS SOLD BY WEIGHT.

PRICES UPON APPLICATION.

Drilling Tools

FOR CABLE SYSTEM

ALL STEEL DRILLING BITS

Size Hole, Inches	Length, Feet	Size Pin, Inches	Threads Per Inch	Wt., Lbs.	Size Hole, Inches	Length, Feet	Size Pin, Inches	Threads Per Inch	Wt., Lbs.
13	5½	2¾x3¾	7	825	16	6½	3½x4½	7	1400
13	6	2¾x3¾	7	900	16	5½	4 x5	7	1250
13	6½	2¾x3¾	7	975	16	6	4 x5	7	1350
13	5½	3 x4	7	850	16	6½	4 x5	7	1450
13	6	3 x4	7	925	17	5½	3 x4	7	1240
13	6½	3 x4	7	1000	17	6	3 x4	7	1350
13	5½	3¼x4¼	7	890	17	6½	3 x4	7	1460
13	6	3¼x4¼	7	965	17	5½	3¼x4¼	7	1280
13	6½	3¼x4¼	7	1040	17	6	3¼x4¼	7	1390
13	5½	3½x4½	7	900	17	6½	3¼x4¼	7	1500
13	6	3½x4½	7	975	17	5½	3½x4½	7	1290
13	6½	3½x4½	7	1050	17	6	3½x4½	7	1400
13	5½	4 x5	7	950	17	6½	3½x4½	7	1510
13	6	4 x5	7	1025	17	5½	4 x5	7	1340
13	6½	4 x5	7	1100	17	6	4 x5	7	1450
14	5½	2¾x3¾	7	900	17	6½	4 x5	7	1560
14	6	2¾x3¾	7	975	18	5½	3 x4	7	1330
14	6½	2¾x3¾	7	1050	18	6	3 x4	7	1450
14	5½	3 x4	7	925	18	6½	3 x4	7	1570
14	6	3 x4	7	1000	18	5½	3¼x4¼	7	1270
14	6½	3 x4	7	1075	18	6	3¼x4¼	7	1490
14	5½	3¼x4¼	7	965	18	6½	3¼x4¼	7	1610
14	6	3¼x4¼	7	1040	18	5½	3½x4½	7	1280
14	6½	3¼x4¼	7	1115	18	6	3½x4½	7	1500
14	5½	3½x4½	7	975	18	6½	3½x4½	7	1620
14	6	3½x4½	7	1050	18	5½	4 x5	7	1330
14	6½	3½x4½	7	1125	18	6	4 x5	7	1550
14	5½	4 x5	7	1025	18	6½	4 x5	7	1670
14	6	4 x5	7	1100	19	5½	3 x4	7	1450
14	6½	4 x5	7	1175	19	6	3 x4	7	1575
15	5½	2¾x3¾	7	1000	19	6½	3 x4	7	1700
15	6	2¾x3¾	7	1100	19	5½	3¼x4¼	7	1490
15	6½	2¾x3¾	7	1200	19	6	3¼x4¼	7	1615
15	5½	3 x4	7	1025	19	6½	3¼x4¼	7	1740
15	6	3 x4	7	1125	19	5½	3½x4½	7	1500
15	6½	3 x4	7	1225	19	6	3½x4½	7	1625
15	5½	3¼x4¼	7	1065	19	6½	3½x4½	7	1750
15	6	3¼x4¼	7	1165	19	5½	4 x5	7	1550
15	6½	3¼x4¼	7	1265	19	6	4 x5	7	1675
15	5½	3½x4½	7	1075	19	6½	4 x5	7	1800
15	6	3½x4½	7	1175	20	5½	3 x4	7	1550
15	6½	3½x4½	7	1275	20	6	3 x4	7	1700
15	5½	4 x5	7	1125	20	6½	3 x4	7	1850
15	6	4 x5	7	1225	20	5½	3¼x4¼	7	1590
15	6½	4 x5	7	1325	20	6	3¼x4¼	7	1740
16	5½	3 x4	7	1150	20	6½	3¼x4¼	7	1890
16	6	3 x4	7	1250	20	5½	3½x4½	7	1600
16	6½	3 x4	7	1350	20	6	3½x4½	7	1750
16	5½	3¼x4¼	7	1190	20	6½	3½x4½	7	1900
16	6	3¼x4¼	7	1290	20	5½	4 x5	7	1650
16	6½	3¼x4¼	7	1390	20	6	4 x5	7	1800
16	5½	3½x4½	7	1200	20	6½	4 x5	7	1950
16	6	3½x4½	7	1300					

When ordering, state size of pin; style of taper; number of threads to the inch (flat or sharp); size of wrench square; also diameter of the hole in which tool is to be used.

ALL STEEL DRILLING BITS SOLD BY WEIGHT—PRICES UPON APPLICATION.

Drilling Tools

FOR CABLE SYSTEM

ROUND REAMER

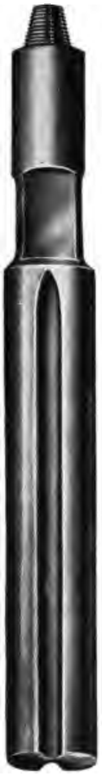


Fig. 91

ROUND REAMERS—ALL STEEL

Used in localities where formation is slanting or broken up, to make a perfect round hole.

Size Hole, Inches	Length, Feet	Size Pin, Inches	Threads Per Inch	Weight, Pounds	Price, Each
4½	5½	1¾x2¾	8	190	$ 70.00
5	5½	2 x3	7	240	80.00
5⅝	5½	2 x3	7	300	90.00
6¼	6	2 x3	7	350	100.00
6⅝	6	2 x3	7	400	110.00
7⅝	6	3 x4	7	575	135.00
8¼	6	3 x4	7	700	160.00
9⅝	6	3 x4	7	875	200.00
10	6	3 x4	7	950	210.00
11⅝	6	3 x4	7	1100	260.00
12½	6	3 x4	7	1350	300.00

When ordering, state weight or actual inside diameter of casing.

HOLLOW REAMERS—ALL STEEL

Used to straighten a crooked hole or to remove the sediment around tools when they are fast, and to make room enough for fishing tool to take hold.

Size Hole, Inches	Length, Feet	Size Pin, Inches	Threads Per Inch	Weight, Pounds	Price, Each
4½	6	1¾x2¾	8	180	$115.00
5	6	2 x3	7	200	120.00
5⅝	6	2 x3	7	250	130.00
6¼	7	2 x3	7	300	140.00
6⅝	8	2 x3	7	370	150.00
7⅝	8	3 x4	7	575	200.00
8¼	8	3 x4	7	625	220.00
9⅝	8	3 x4	7	775	240.00
10	8	3 x4	7	825	250.00
11⅝	8	3 x4	7	1000	280.00
12½	8	3 x4	7	1150	300.00

When ordering, state size of pin; style of taper; number of threads to the inch (flat or sharp); size of wrench square; also diameter of hole in which tool is to be used.

HOLLOW REAMER

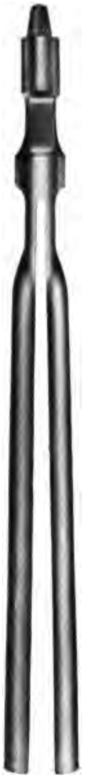


Fig. 92.

BIT GAUGES

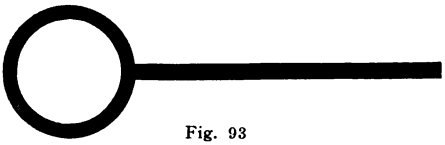


Fig. 93

Size ....inches	4½	5	5⅝	6¼	6⅝	7⅝	8¼	9⅝	10
Weight ......pounds	1¼	1½	1½	1½	1¾	2	2½	3	3
Price ....each	$0.90	$0.95	$1.00	$1.10	$1.15	$1.25	$1.35	$1.45	$1.50
Size ....inches	11⅝	12½	13½	14½	15½	17	18	19	20
Weight ......pounds	3¼	3½	3¾	4	4¼	4¾	5¼	5½	5¾
Price ....each	$1.75	$2.00	$2.20	$2.35	$2.50	$2.75	$3.00	$3.25	$3.50

Drilling Tools

FOR CABLE SYSTEM

DOUBLE IMPROVED UNDER REAMERS

(Patented)

SHOWING BODY WITH CUTTERS REMOVED.

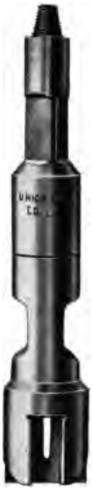


Fig. 94

EXPANDED AS IN OPERATION.

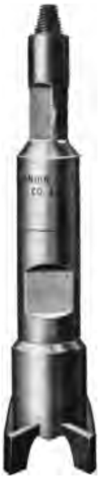


Fig. 95

SIDE VIEW SHOWING WIDE CUTTING SURFACE OF CUTTERS.

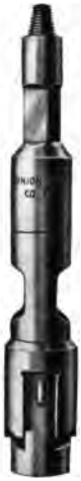


Fig. 96

READY FOR PIPE SHOWING CUTTERS COLLAPSED.

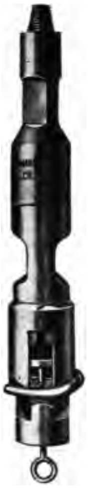


Fig. 97

BOTTOM VIEW SHOWING MASSIVENESS IN CONSTRUCTION.

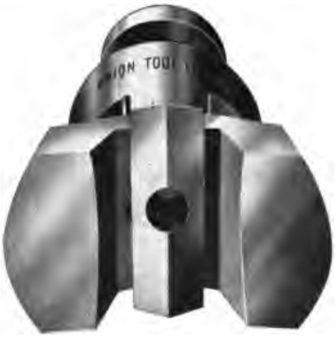


Fig. 98

FOR ENTERING PIPE SHOWING EASE AND SIMPLICITY OF SETTING.

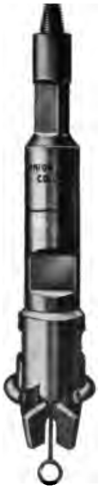


Fig. 99

FOR DESCRIPTION, PRICES AND WEIGHTS, SEE PAGE 43.

Drilling Tools

FOR CABLE SYSTEM

DOUBLE IMPROVED UNDER REAMERS

(Patented)

Used for enlarging the hole under the drive pipe or casing to the size of the shoe or coupling so that the drive pipe or casing may be readily driven down.

DIRECTIONS FOR SETTING

Screw the eye bolt in the key carrying mandrel, pull down until cutters collapse below the end of the spreading bar, then place setting ring on riders of cutters, which holds them in a collapsed position, after which the eye bolt is removed. Lower into pipe, taking ring off at first wrench square. After passing through the pipe the cutters automatically expand to working position.

Size, Inches	Size of Pin, Inches	Threads Per Inch	Under Reamer		Extra Cutters	
			Weight, Pounds	Price, Each	Weight, Pounds	Price, Per Set
3¼	1 x1¾	8	75	$ 90.00	8	$ 15.00
3½	1 x1¾	8	90	95.00	9	17.50
4	1⅝x2½	8	110	100.00	10	20.00
4¼	1¾x2¾	8	125	112.50	11	22.50
4½	1¾x2¾	8	155	125.00	12	25.00
5	2 x3	7	230	140.00	18	30.00
5⅝	2 x3	7	300	200.00	25	30.00
6¼	2 x3	7	325	215.00	28	32.00
6⅝	2 x3	7	345	220.00	30	35.00
7	2 x3	7	390	225.00	45	36.00
7⅝	3 x4	7	440	250.00	65	40.00
8¼	3 x4	7	500	265.00	70	42.00
9	3 x4	7	560	275.00	100	45.00
9⅝	6 x4	7	625	300.00	120	48.00
10	3 x4	7	690	310.00	140	50.50
11	3 x4	7	840	325.00	170	52.50
11⅝	3 x4	7	925	350.00	220	55.00
12½	3 x4	7	1125	385.00	240	58.00
13½	3 x4	7	1175	425.00	270	60.00
14½	3 x4	7	1300	490.00	285	70.00
15½	3 x4	7	1425	560.00	300	80.00
16	3 x4	7	1485	620.00	315	85.00
17	3 x4	7	1625	685.00	330	90.00
18	3 x4	7	1750	750.00	350	100.00

When ordering, state size of pin; style of taper; number of threads to the inch (flat or sharp); size of wrench square; also weight of casing in which reamer is to be used.

When ordering extra cutters, state serial number stamped on reamer square, and weight of casing in which cutters are to be used.

PARTS FOR DOUBLE IMPROVED UNDER REAMERS

SEE ILLUSTRATIONS ON FOLLOWING PAGE

Size, Inches	Body, Each	Substitute, Each	Mandrel, Each	Spring, Each	Key, Each	Ring, Each	Eye Bolt, Each
3¼	$60.00	$8.50	$1.50	$1.50	$0.50	$0.50	$0.50
3½	62.50	8.50	1.50	1.50	.50	.50	.50
4	65.00	8.50	1.50	1.50	.50	.50	.50
4¼	72.50	9.50	2.00	2.00	.75	.50	.50
4½	80.00	12.00	2.00	2.00	.75	.50	.50
5	90.00	12.00	2.00	2.00	.75	.50	.50
5⅝	144.00	17.00	2.25	2.25	1.00	.50	.50
6¼	152.50	21.00	2.50	2.50	1.00	.50	.50
6⅝	153.50	21.50	2.50	2.50	1.00	.75	.75
7	154.00	24.00	2.75	2.75	1.25	.75	.75
7⅝	172.00	25.50	3.00	3.00	1.50	.75	.75
8¼	185.00	25.50	3.00	3.00	1.50	.75	.75
9	190.00	26.50	3.25	3.25	1.75	.75	.75
9⅝	205.00	32.50	3.50	3.50	2.00	.75	.75
10	212.50	32.50	3.50	3.50	2.00	.75	.75
11	222.50	35.00	3.75	3.75	2.00	.75	.75
11⅝	242.00	36.50	4.00	4.00	2.25	1.00	1.00
12½	273.00	37.00	4.00	4.00	2.50	1.00	1.00
13½	310.00	37.50	4.25	4.25	2.50	1.00	1.00
14½	361.50	40.00	4.50	4.50	2.50	1.00	1.00
15½	416.50	42.50	5.00	5.00	3.00	1.00	1.00
16	465.00	45.00	6.00	6.00	3.50	1.25	1.25
17	520.00	47.50	6.50	6.50	4.00	1.25	1.25
18	568.00	50.00	7.50	7.50	4.50	1.50	1.50

Drilling Tools

FOR CABLE SYSTEM

PARTS FOR DOUBLE IMPROVED UNDER REAMERS

(Patented)

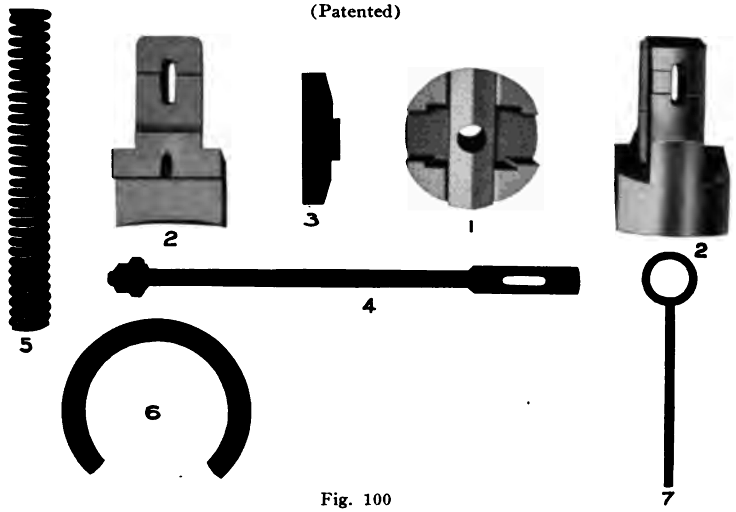


Fig. 100

No. 1—Body.
No. 2—Cutters (Front and back view).
No. 3—Key.
No. 4—Key-carrying mandrel.
No. 5—Spring.
No. 6—Setting Ring.
No. 7—Eye bolt.

TONGS

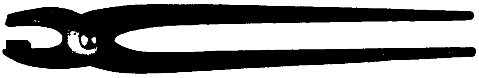


Fig. 101

For holding cutters while taking them from the fire to the block or anvil for dressing.

For cutters . . . . inch	3¼	3½	4	4¼	4½	5	5⅝	6¼	6⅝	7	7⅝	8¼
Weight . . . . . pounds	6	6	6	8	8	8	12	12	14	16	18	21
Price . . . . each	$2.00	$2.00	$2.00	$2.25	$2.25	$2.25	$2.50	$2.50	$2.50	$2.75	$3.50	$3.50
For cutters . . . . inch	9	9⅝	10	11	11⅝	12½	13½	14½	15½	16	17	18
Weight . . . . . pounds	23	25	26	28	30	32	34	36	38	40	42	45
Price. . . . . each	$3.75	$4.00	$4.00	$4.00	$4.25	$4.50	$4.50	$5.00	$6.00	$7.00	$8.00	$9.50

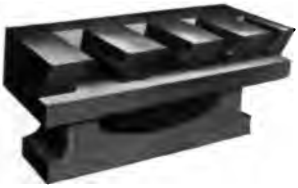


Fig. 102

Dressing Blocks

To be used for dressing under reamer cutters. Can also be used as an anvil.

For Size Cutters, Inches	Weight, Pounds	Price, Each
For 4, 4½ and 5	360	$17.00
For 6, 8 and 10	630	30.00
For 5⅝, 7⅝, 9⅝ and 11⅝	750	35.00
For 6, 8, 10 and 12½	1000	45.00

Drilling Tools

FOR CABLE SYSTEM

WILSON UNDER REAMERS

(Patented)

EXPANDED AS IN OPERATION

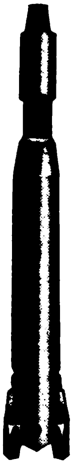


Fig. 103

SHOWING INTERIOR PARTS

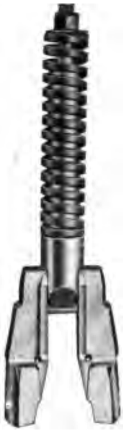


Fig. 104

SHOWING METHOD OF REMOVING CUTTERS AND INTERIOR PARTS

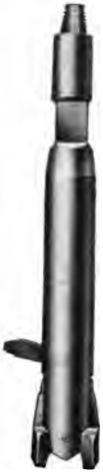


Fig. 105

The body of this reamer is made of a single forging of the best nickel steel. It has no middle joint, thereby eliminating all danger of the body unscrewing or breaking in two pieces.

The cutters are suspended from the tee by slots cut only partially through them, a feature found only in this tool, and are dovetailed into the body which holds them in place.

The working parts are all held in position by a nickel steel key (shown above), which remains in a stationary position during operation.

The safety bolt, another feature of this reamer, is a double guarantee against the loss of the cutters. It extends across the mouth of the reamer, underneath the key. Should this key break, the tee and cutters are so interlocked that it is impossible for them to pass the safety bolt.

Size, Inches	Size of Pin, Inches	Threads Per Inch	Under Reamer		Extra Cutters	
			Weight, Pounds	Price, Each	Weight, Pounds	Price, Per Set
4½	1⅝x2½	8	160	$125.00	15	$ 25.00
5	2 x3	7	290	140.00	24	30.00
5⅝	2 x3	7	350	200.00	29	30.00
6¼	2 x3	7	373	215.00	36	32.00
6⅝	2 x3	7	390	220.00	38	35.00
7	3 x4	7	485	225.00	47	36.00
7⅝	3 x4	7	560	250.00	65	40.00
8¼	3 x4	7	632	265.00	77	42.00
9	3 x4	7	850	275.00	100	45.00
9⅝	3 x4	7	860	300.00	115	48.00
10	3 x4	7	1085	310.00	150	50.50
11	3 x4	7	1260	325.00	185	52.50
11⅝	3 x4	7	1300	350.00	200	55.00
12½	3 x4	7	1339	385.00	217	58.00
13½	3 x4	7	1400	425.00	250	60.00
15½	3 x4	7	1720	560.00	278	80.00
16	3 x4	7	1860	620.00	320	85.00
17	4 x5	7	1920	685.00	380	90.00
18	4 x5	7	2195	750.00	390	100.00

When ordering, state size of pin; style of taper; number of threads to the inch (flat or sharp); size of wrench square; also weight of casing in which reamer is to be used.

Drilling Tools

FOR CABLE SYSTEM

PATENT TAPER JOINTS

BOX

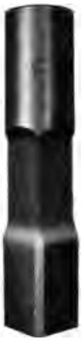


Fig. 106

BOX FOR WELDING ON TOOLS

Size, Inches	Threads Per Inch	Diameter of Collar, Inches	Weight, Pounds	Price, Each
1⅝x2½	8	3¾	50	$ 5.00
1¾x2¾	8	4	60	5.65
2 x3	7	4½	75	6.90
2¼x3¼	7	4¾	85	7.50
2½x3½	7	5¼	100	8.15
2¾x3¾	7	5½	115	9.40
3 x4	7	6	135	11.25
3¼x4¼	7	6½	180	13.15
3½x4½	7	6¾	190	15.00
4 x5	7	7¼	240	16.50

PIN FOR WELDING ON TOOLS

Size, Inches	Threads Per Inch	Diameter of Collar, Inches	Weight, Pounds	Price, Each
1⅝x2½	8	3½	45	$ 4.40
1¾x2¾	8	3¾	55	5.00
2 x3	7	4¼	65	6.25
2¼x3¼	7	4½	75	6.90
2½x3½	7	5	90	7.50
2¾x3¾	7	5¼	105	8.75
3 x4	7	5¾	130	10.65
3¼x4¼	7	6¼	170	12.50
3½x4½	7	6½	180	14.25
4 x5	7	7	230	15.60

When ordering, state size of box and pin; style of taper; number of threads to the inch (flat or sharp); also size of wrench square.

PIN

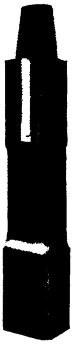


Fig. 107

THREAD PROTECTORS

FOR BOX

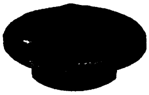


Fig. 108

FOR PIN

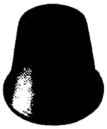


Fig. 109

For size box or pin...inches	1⅝x2½	1¾x2¾	2x3	2¼x3¼	2½x3½	2¾x3¾	3x4	3¼x4¼	3½x4½	4x5
Number of threads per inch	8	8	7	7	7	7	7	7	7	7
Wt. of box protectors..lbs.	1½	1½	2	2½	3	3½	4	4½	5	6
Wt. of pin protectors..lbs.	2	2	3	3	5	6	7	8	9	10
Price of box protectors.each	$.40	$.45	$.50	$.55	$.60	$.80	$.90	$1.00	$1.15	$1.25
Price of pin protectors. each	.45	.50	.60	.70	.80	.90	1.00	1.10	1.25	1.40

BOX AND PIN TEMPLATES

PIN

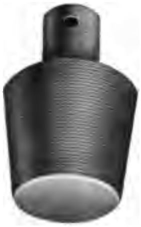


Fig. 110

Size, Inches	Threads Per Inch	Weight, Pounds	Price, Per Set
1⅝x2½	8	11	$28.00
1¾x2¾	8	12	28.00
2 x3	7	17	28.00
2¼x3¼	7	19	31.00
2½x3½	7	21	34.50
2¾x3¾	7	25	37.50
3 x4	7	30	42.00
3¼x4¼	7	35	46.00
3½x4½	7	43	50.00
4 x5	7	50	56.00

When ordering, state style of taper and number of threads to the inch (flat or sharp).

BOX

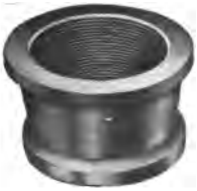


Fig. 111

Drilling Tools

FOR CABLE SYSTEM

SUBSTITUTES

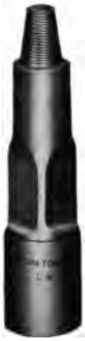


Fig. 112

Size Pin, Inches	Size Box, Inches	Threads Per Inch	Weight, Pounds	Price, Each
1⅝x2½	1¾x2¾	8	60	$10.00
2 x3	2¼x3¼	7	85	13.75
2 x3	2½x3½	7	105	14.50
2 x3	2¾x3¾	7	110	15.75
2 x3	3 x4	7	125	17.50
2¼x3¼	2½x3½	7	110	15.00
2¼x3¼	2¾x3¾	7	115	16.25
2¼x3¼	3 x4	7	130	18.25
2½x3½	2¾x3¾	7	120	17.00
2½x3½	3 x4	7	135	18.75
2¾x3¾	3 x4	7	140	20.00
3 x4	3¼x4¼	7	175	23.75
3 x4	3½x4½	7	180	25.50
3 x4	4 x5	7	200	27.00
3¼x4¼	4 x5	7	205	28.75
3½x4½	4 x5	7	210	31.00

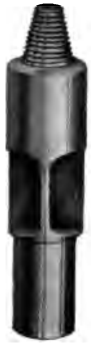


Fig. 113

Substitutes with joints reverse to those shown above will be furnished at the same prices.

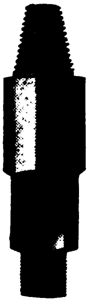


Fig. 114

PIN TO TUBING SUBSTITUTES

Size Pin, Inches	Threads Per Inch	Size Tubing, Inches	Weight, Pounds	Price, Each
1⅝x2½	8	2 to 3	45	$ 6.50
1¾x2¾	8	2 to 3	55	7.00
2 x3	7	2 to 3	65	8.25
2¼x3¼	7	2 to 3	75	9.00
2½x3½	7	2 to 3	90	9.50
2¾x3¾	7	2 to 3	105	10.75
3 x4	7	2 to 3	130	12.50

BOX TO TUBING SUBSTITUTES

Size Box, Inches	Threads Per Inch	Size Tubing, Inches	Weight, Pounds	Price, Each
1⅝x2½	8	2 to 3	50	$ 7.00
1¾x2¾	8	2 to 3	60	7.50
2 x3	7	2 to 3	75	9.00
2¼x3¼	7	2 to 3	85	9.50
2½x3½	7	2 to 3	100	10.00
2¾x3¾	7	2 to 3	115	11.40
3 x4	7	2 to 3	135	13.25

When ordering, state size of box and pin; style of taper; number of threads to the inch (flat or sharp); also size of wrench square.

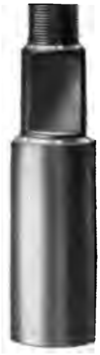
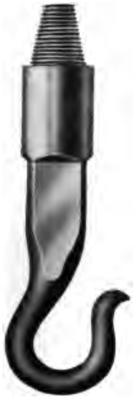


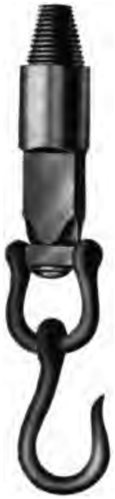
Fig. 115

Drilling Tools

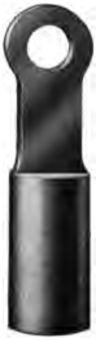
FOR CABLE SYSTEM



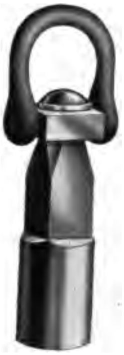
Pin With Solid Hook
Fig. 116



Pin With Swivel Hook
Fig. 117



Box With Solid Eye
Fig. 118



Box With Swivel Eye
Fig. 119

PIN WITH SOLID HOOK

Size, Inches	Thr'ds Per In.	Weight, Pounds	Price, Each
1⅝x2½	8	60	$15.50
1¾x2¾	8	63	16.50
2 x3	7	74	19.00
2¼x3¼	7	85	20.00
2½x3½	7	104	23.00
2¾x3¾	7	121	26.00
3 x4	7	150	32.00
3¼x4¼	7	196	39.00
3½x4½	7	207	41.00
4 x5	7	265	45.00

PIN WITH SWIVEL HOOK

Size, Inches	Thr'ds Per In.	Weight, Pounds	Price, Each
1⅝x2½	8	65	$18.00
1¾x2¾	8	69	20.00
2 x3	7	86	25.00
2¼x3¼	7	98	27.00
2½x3½	7	115	31.50
2¾x3¾	7	132	34.50
3 x4	7	155	40.00
3¼x4¼	7	207	46.00
3½x4½	7	219	49.00
4 x5	7	276	52.50

BOX WITH SOLID EYE

Size, Inches	Thr'ds Per In.	Weight, Pounds	Price, Each
1⅝x2½	8	55	$16.00
1¾x2¾	8	60	17.00
2 x3	7	72	20.00
2¼x3¼	7	82	21.00
2½x3½	7	99	24.00
2¾x3¾	7	115	27.50
3 x4	7	143	34.50
3¼x4¼	7	187	42.00
3½x4½	7	198	45.00
4 x5	7	253	49.00

BOX WITH SWIVEL EYE

Size, Inches	Thr'ds Per In.	Weight, Pounds	Price, Each
1⅝x2½	8	60	$23.00
1¾x2¾	8	66	24.50
2 x3	7	82	27.00
2¼x3¼	7	93	28.50
2½x3½	7	110	31.00
2¾x3¾	7	126	34.50
3 x4	7	148	43.00
3¼x4¼	7	198	52.50
3½x4½	7	210	56.00
4 x5	7	264	60.00

When ordering, state size of box or pin; style of taper; number of threads to the inch (flat or sharp); also size of wrench square.

Drilling Tools

FOR CABLE SYSTEM

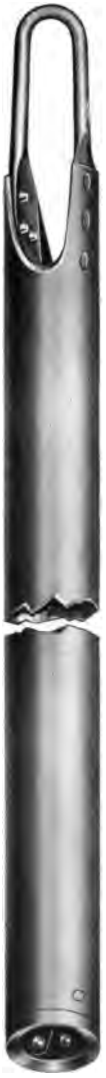


Fig. 120

COMMON SAND PUMPS

Inside Diam., Ins.	Size Hole, Ins.	Len'th, Ft.	Weight, Lbs.	Inside Diam., Ins.	Size Hole, Ins.	Len'th, Ft.	Weight, Lbs.
3	4½	14	130	6	8¼	18	380
3	4½	16	145	6	8¼	20	420
3	4½	18	160	6⅝	8¼	14	285
3	4½	20	175	6⅝	8¼	16	320
3½	5⅝	14	150	6⅝	8¼	18	355
3½	5⅝	16	170	6⅝	8¼	20	390
3½	5⅝	18	185	7⅝	9⅝	14	275
3½	5⅝	20	205	7⅝	9⅝	16	300
4	6	14	170	7⅝	9⅝	18	335
4	6	16	195	7⅝	9⅝	20	370
4	6	18	215	8¼	10	14	400
4	6	20	235	8¼	10	16	450
4¼	6	14	155	8¼	10	18	500
4¼	6	16	175	8¼	10	20	550
4¼	6	18	190	9⅝	11⅝	14	390
4¼	6	20	210	9⅝	11⅝	16	435
4½	6⅝	14	155	9⅝	11⅝	18	480
4½	6⅝	16	175	9⅝	11⅝	20	525
4½	6⅝	18	190	10	12½	14	580
4½	6⅝	20	210	10	12½	16	650
5	7	14	230	10	12½	18	720
5	7	16	260	10	12½	20	790
5	7	18	290	11⅝	13½	14	560
5	7	20	320	11⅝	13½	16	620
5⅝	7⅝	14	230	11⅝	13½	18	680
5⅝	7⅝	16	260	11⅝	13½	20	740
5⅝	7⅝	18	290	12½	14½	14	630
5⅝	7⅝	20	320	12½	14½	16	700
6	8¼	14	300	12½	14½	18	765
6	8¼	16	340	12½	14½	20	830

PRICES UPON APPLICATION.

SECTIONAL COMMON SAND PUMPS

FLUSH JOINT .

Inside Diam., Ins.	Size Hole, Ins.	Len'th, Ft.	Weight, Lbs.	Inside Diam., Ins.	Size Hole, Ins.	Len'th, Ft.	Weight, Lbs.
3	4½	30	255	4½	6⅝	30	480
3	4½	32	270	4½	6⅝	32	510
3	4½	34	285	4½	6⅝	34	540
3	4½	36	310	4½	6⅝	36	570
3	4½	38	315	4½	6⅝	38	600
3	4½	40	330	4½	6⅝	40	630
3½	5⅝	30	300	5	7	30	470
3½	5⅝	32	320	5	7	32	500
3½	5⅝	34	340	5	7	34	530
3½	5⅝	36	355	5	7	36	560
3½	5⅝	38	370	5	7	38	590
3½	5⅝	40	390	5	7	40	620
4	6	30	350	6	8¼	30	610
4	6	32	370	6	8¼	32	645
4	6	34	390	6	8¼	34	685
4	6	36	410	6	8¼	36	720
4	6	38	435	6	8¼	38	760
4	6	40	455	6	8¼	40	800

PRICES UPON APPLICATION.

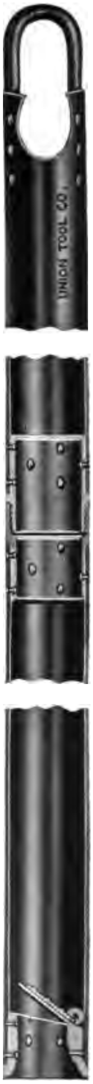


Fig. 121

Drilling Tools

FOR CABLE SYSTEM

DART VALVE BAILERS

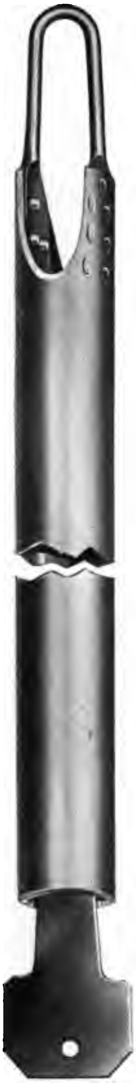


Fig. 122

Inside Diam., Ins.	Size Hole, Ins.	Len'th, Ft.	Weight, Lbs.	Inside Diam., Ins.	Size Hole, Ins.	Len'th, Ft.	Weight, Lbs.
3	4½	14	130	6	8¼	18	410
3	4½	16	145	6	8¼	20	450
3	4½	18	160	6⅝	8¼	14	325
3	4½	20	175	6⅝	8¼	16	360
3½	5⅝	14	160	6⅝	8¼	18	390
3½	5⅝	16	180	6⅝	8¼	20	425
3½	5⅝	18	200	7⅝	9⅝	14	335
3½	5⅝	20	215	7⅝	9⅝	16	365
4	6	14	185	7⅝	9⅝	18	400
4	6	16	210	7⅝	9⅝	20	430
4	6	18	230	8¼	10	14	480
4	6	20	250	8¼	10	16	525
4¼	6	14	170	8¼	10	18	575
4¼	6	16	190	8¼	10	20	620
4¼	6	18	210	9⅝	11⅝	14	485
4¼	6	20	230	9⅝	11⅝	16	530
4½	6⅝	14	170	9⅝	11⅝	18	575
4½	6⅝	16	190	9⅝	11⅝	20	620
4½	6⅝	18	210	10	12½	14	680
4½	6⅝	20	230	10	12½	16	750
5	7	14	255	10	12½	18	825
5	7	16	285	10	12½	20	900
5	7	18	315	11⅝	13½	14	660
5	7	20	345	11⅝	13½	16	725
5⅝	7⅝	14	260	11⅝	13½	18	785
5⅝	7⅝	16	290	11⅝	13½	20	850
5⅝	7⅝	18	320	12½	14½	14	760
5⅝	7⅝	20	350	12½	14½	16	830
6	8¼	14	340	12½	14½	18	900
6	8¼	16	375	12½	14½	20	960

PRICES UPON APPLICATION.

SECTIONAL DART VALVE BAILERS

Inside Diam., Ins.	Size Hole, Ins.	Len'th, Ft.	Weight, Lbs.	Inside Diam., Ins.	Size Hole, Ins.	Len'th, Ft.	Weight, Lbs.
3	4½	30	260	4½	6⅝	30	500
3	4½	32	275	4½	6⅝	32	530
3	4½	34	290	4½	6⅝	34	560
3	4½	36	305	4½	6⅝	36	590
3	4½	38	320	4½	6⅝	38	620
3	4½	40	335	4½	6⅝	40	650
3½	5⅝	30	310	5	7	30	500
3½	5⅝	32	330	5	7	32	525
3½	5⅝	34	350	5	7	34	550
3½	5⅝	36	365	5	7	36	580
3½	5⅝	38	380	5	7	38	615
3½	5⅝	40	400	5	7	40	640
4	6	30	365	6	8¼	30	650
4	6	32	385	6	8¼	32	680
4	6	34	405	6	8¼	34	720
4	6	36	425	6	8¼	36	760
4	6	38	450	6	8¼	38	800
4	6	40	470	6	8¼	40	840

PRICES UPON APPLICATION.

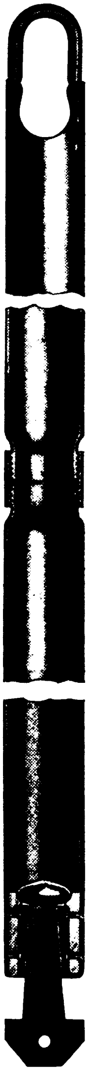


Fig. 123

Drilling Tools

FOR CABLE SYSTEM

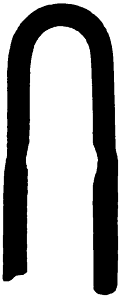


Fig. 124

BAILER BAILS

Size ....inches	3	3¼	3½	4	4¼	4½	5	5⅝
Weight .....pounds	4	5	5	6	6	8	10	12
Price ....each	$.75	.75	.75	.75	.75	.75	1.00	1.50
Size ....inches	6 or 6¼	6⅝	7⅝	8 or 8¼	9⅝	10	11⅝	12½
Weight .....pounds	15	16	18	20	28	30	33	35
Price ....each	$2.00	2.25	2.75	3.25	3.75	4.00	5.00	6.00

PLOTZ TOPS

For use on sand pumps and bailers working in wells where excessive gas pressures exist.

So constructed as to automatically release gas pressures contained within the sand pump or bailer, and to prevent the contents from being blown out and the pump or bailer from being brought to the surface empty.

Size ....inches	3	3¼	3½	4	4¼	4½
Price ....each	$25.00	25.00	25.00	28.00	28.00	28.00
Size.................inches	5	5⅝	6 or 6¼	6⅝	7⅝	8 or 8¼
Price ....each	$30.00	30.00	31.50	32.50	36.50	41.00

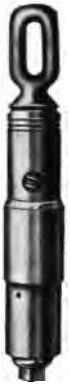


Fig. 125

COMMON SAND PUMP BOTTOMS

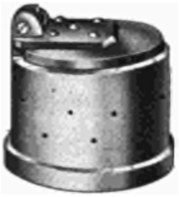


Fig. 126

Size ....inches	3	3¼	3½	4	4¼	4½	5	5⅝
Weight .....pounds	10	11	11	13	13	15	20	20
Price ....each	$7.50	7.50	7.50	9.00	9.00	9.00	10.00	11.00
Size ....inches	6 or 6¼	6⅝	7⅝	8 or 8¼	9⅝	10	11⅝	12½
Weight .....pounds	25	30	40	40	55	60	100	120
Price ....each	$12.50	13.25	15.50	16.50	19.00	21.00	27.00	32.50

DART BAILER VALVES

Size ....inches	3	3¼	3½	4	4¼	4½	5	5⅝
Weight .....pounds	18	22	25	30	32	35	45	50
Price ....each	$4.75	5.75	6.50	8.50	9.50	10.25	12.50	14.50
Size ....inches	6 or 6¼	6⅝	7⅝	8 or 8¼	9⅝	10	11⅝	12½
Weight .....pounds	60	70	100	115	150	160	200	250
Price ....each	$16.25	18.50	22.50	24.00	31.00	33.00	37.50	42.50

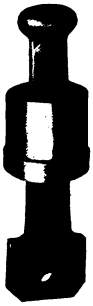


Fig. 127

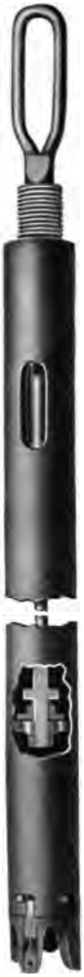


Fig. 128

Drilling Tools

FOR CABLE SYSTEM

LARKIN'S IMPROVED SAND PUMPS

Outside diam. inches	3½	4	4¼	5	5½	6	7	8
For size hole. inches	4	4¼,4½	5,5$\frac{3}{16}$	5⅝,6	6¼,6⅝	7⅝,8¼	7⅜,8¼	9⅝
Length of pump. feet	20	20	20	20	20	20	20	20
Weight ....pounds	197	235	256	325	362	380	395	415
Price ....each	$60.00	70.00	80.00	90.00	100.00	106.00	115.00	150.00

SPECIAL LENGTHS TO ORDER.

PARTS

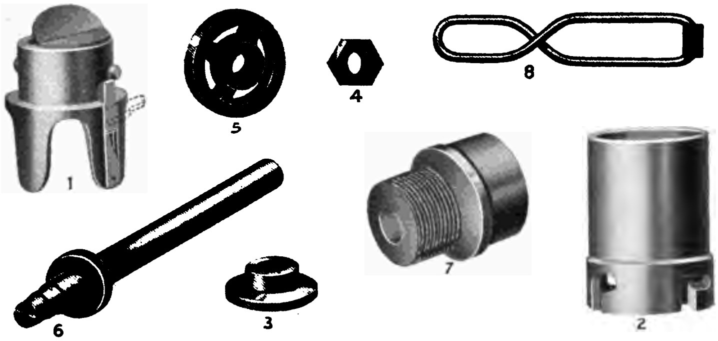


Fig. 129

Symbol Number	NAME OF PART	Size in Inches							
		3½	4	4¼	5	5½	6	7	8
1	Bottom	$16.00	$18.00	$20.00	$22.00	$24.00	$30.00	$34.00	$50.00
2	Bottom bushing	7.00	8.00	8.00	9.00	10.00	12.00	14.00	20.00
3	Valve gland	2.00	2.00	2.00	3.00	4.50	5.00	5.50	6.00
4	Valve nut	.50	.50	.50	.50	.50	.50	.50	.50
5	Valve seat	1.50	1.50	1.50	2.50	3.00	3.50	4.00	4.50
3 4-5	Valve complete	4.00	4.00	4.00	6.00	8.00	9.00	10.00	11.00
6	Stub end	4.00	4.50	5.00	6.00	7.00	7.00	8.00	10.00
7	Top bushing	7.00	8.00	8.00	9.00	10.00	10.00	11.00	18.00
8	Loop	6.00	7.00	7.00	7.00	8.00	8.00	8.00	10.00
	Plunger	14.00	14.00	14.00	15.00	16.00	16.00	18.00	22.00
	Tube	28.00	30.00	32.00	36.00	44.00	46.00	48.00	50.00
	Dog and spring	2.50	2.50	2.50	2.50	3.00	3.00	4.00	4.00

Drilling Tools

FOR CABLE SYSTEM

COMMON DERRICK CRANES

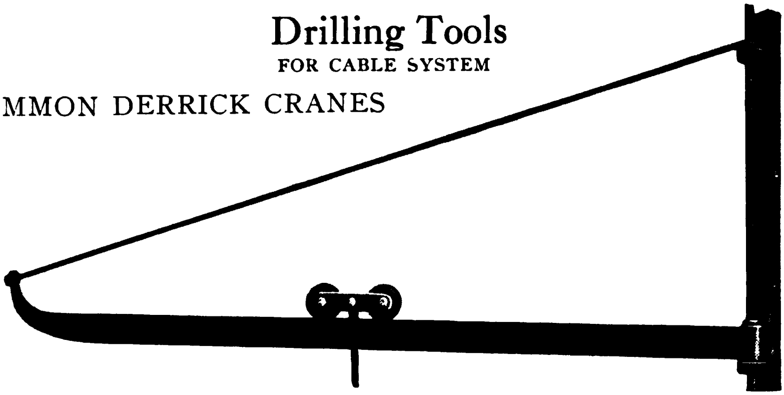


Fig. 130

DESCRIPTION	Weight, Pounds	Price, Each
Complete with 1x5-inch beam	335	$30.00
Complete with 1x6-inch beam	370	35.00

PARTS

NAME OF PART	Weight, Pounds	Price, Each	NAME OF PART	Weight, Pounds	Price, Each
Beam 1x5-inch	210	$15.00	Eye bolts with washers (2)	15	$2.50
Beam 1x6-inch	245	20.00	Strain rod	28	3.00
Trolley	40	7.75	Upright rod	27	3.00
Trolley wheels	...	1.50			

TEE BEAM DERRICK CRANES

BALL BEARING

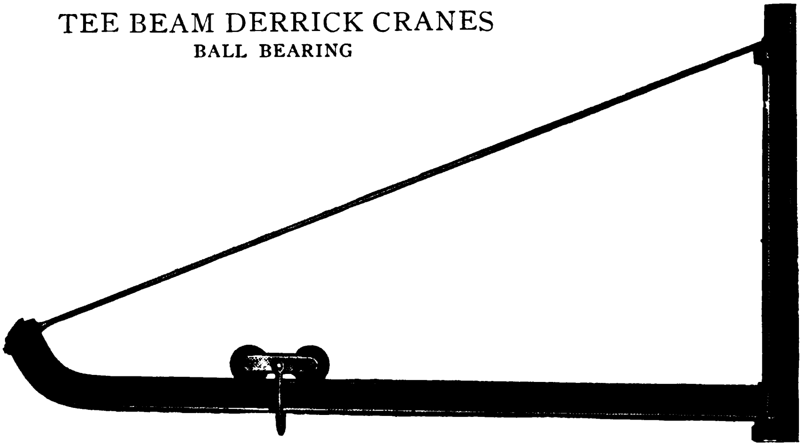


Fig. 131

BALL BEARING TROLLEY AND POST BEARING

DESCRIPTION	Weight, Pounds	Price, Each
Complete with 4-inch tee beam	356	$71.00

PARTS

NAME OF PART	Weight, Pounds	Price, Each	NAME OF PART	Weight, Pounds	Price, Each
Beam 4-inch tee iron	171	$28.50	Eye bolts with washers (2)	27½	$5.00
Ball bearing trolley	51	27.00	Strain rod	47	4.25
Trolley wheels	...	3.50	Upright rod	32	3.00
Ball bearing post bearing	...	3.75			

Drilling Tools

FOR CABLE SYSTEM

BARRETT PATENT OIL WELL JACKS

TO TIGHTEN AND LOOSEN THE JOINTS OF DRILLING TOOLS

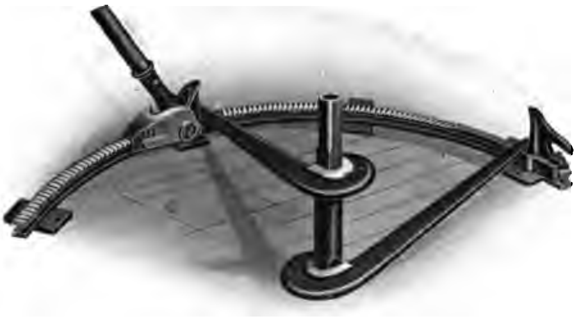


Fig. 132
SHOWING JACK IN OPERATION

No. 1

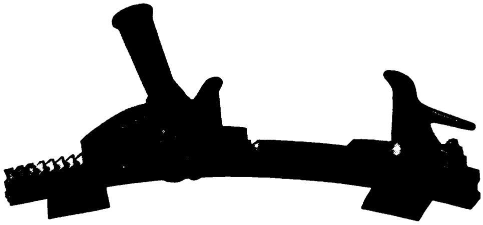


Fig. 133

Equipped with an improved reversing appliance, by which spring levers are dispensed with; a feature found only in the Barrett jacks.

No. 2

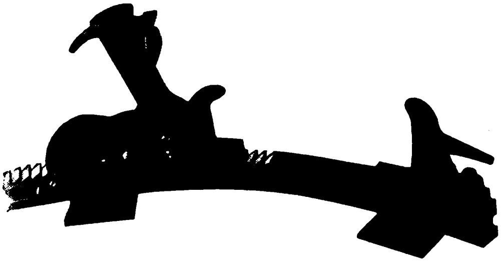


Fig. 134

A powerful, durable and convenient jack. It is the heaviest and strongest of oil well jacks and will give perfect satisfaction.

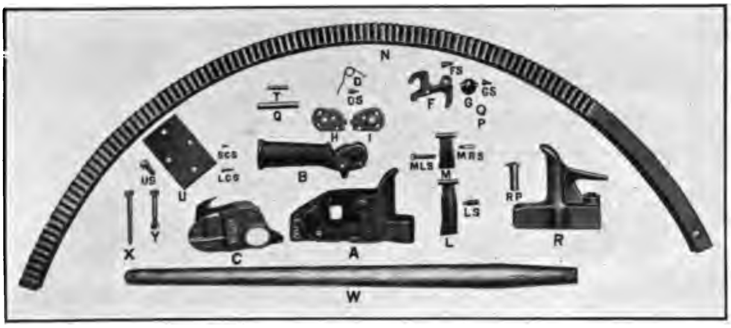
Size number	1	2
Weight .... pounds	209	280
Price .... each	$65.00	$90.00

THE ABOVE PRICES INCLUDE WOOD HANDLE.

Drilling Tools

FOR CABLE SYSTEM

PARTS OF No. 1 BARRETT PATENT OIL WELL JACK



NO. 1 PARTS

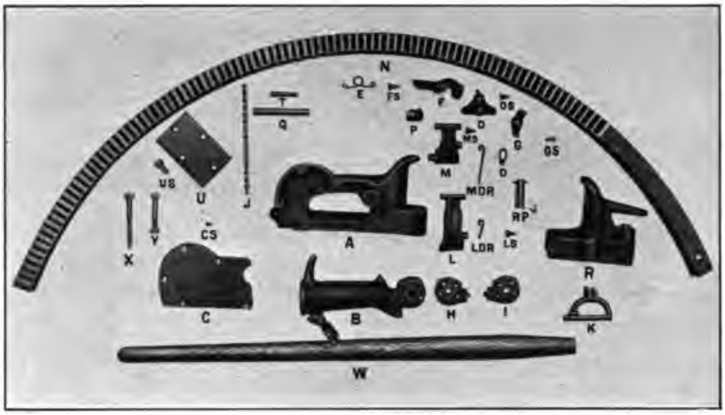
Fig. 135

Symbol	NAME OF PART		Price
	Base or cage, complete	each	$32.00
A	Base or cage, with bushings	"	12.00
B	Socket lever, with side plates	"	5.50
C	Shield	"	2.00
D	Spring	"	.20
F	Brass lowering blocks	"	3.00
G	Eccentric	"	.60
H	**Right hand side plate**	"	.50
I	Left hand side plate	"	.50
L	Long pawl	"	3.50
M	Short pawl	"	3.00
N	Steel rack and plates	"	32.00
P	Bushings, (2)	"	.30
Q	Fulcrum pin	"	.50
R	Wrench post and pin	"	7.50
T	Socket lever rivet, (2)	"	.10
U	Rack plate, (4)	"	.60
W	Wood handles	"	.60
RP	Wrench post pin	"	.50
LS	Long pawl screw	"	.20
MRS	Short pawl reversing screw	"	.20
MLS	Short pawl lifting screw	"	.20
DS	Spring screw	"	.20
FS	Lowering block screw	"	.20
GS	Eccentric screw	"	.20
US	Rack plate screw, (8)	"	.20
SCS	Short shield screw, (3)	"	.10
LCS	Long shield screw	"	.10
X	Lag screw, (3)	"	.20
Y	Bolt and washer, (5)	"	.30

Drilling Tools

FOR CABLE SYSTEM

PARTS OF No. 2 BARRETT PATENT OIL WELL JACK



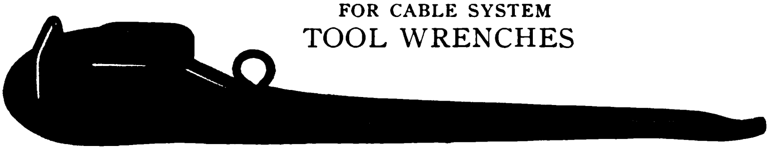
NO. 2 PARTS
Fig. 136

Symbol	NAME OF PART	Price
	Base or cage, complete .... each	$42.00
A	Base or cage, with bushings .... “	18.00
B	Socket lever, with side plates .... “	8.00
C	Shield .... “	2.00
D	Adjusting link, (2) .... “	.40
E	Spring .... “	.60
F	Intermediate lever .... “	.50
G	Reversing lever .... “	.40
H	Right hand side plate .... “	.60
I	Left hand side plate .... “	.60
J	Carring handle chain .... “	1.00
K	Carring handle .... “	.60
L	Long pawl .... “	4.00
M	Short pawl .... “	3.50
N	Steel rack with plates .... “	48.00
O	Spring holder .... “	.50
P	Bushings, (2) .... “	.40
Q	Fulcrum pin .... “	.60
R	Wrench post and pin .... “	9.50
T	Socket lever rivet, (2) .... “	.10
U	Rack plate, (4) .... “	.80
W	Wood handle .... “	.70
RP	Wrench post pin .... “	.50
LDR	Long pawl rod .... “	.30
MDR	Short pawl rod .... “	.30
LS	Long pawl screw .... “	.20
MS	Short pawl screw .... “	.20
OS	Spring holder screw .... “	.20
FS	Intermediate lever screw .... “	.20
GS	Reversing lever screw .... “	.20
CS	Shield screws, (5) .... “	.10
US	Rack plate screw, (8) .... “	.20
X	Lag screws, (3) .... “	.20
Y	Bolt and washer, (5) .... “	.30

Drilling Tools

FOR CABLE SYSTEM

TOOL WRENCHES



Right Hand—Fig. 137

Left Hand—Fig. 138

TWO IN SET—RIGHT AND LEFT HAND

Size of square.......inches	1¾	2¾	2¾	3¼	3¼	3¼	4	4	4¼
Weight each ....pounds Per set of two............	50 $28.00	75 $30.00	112 $32.00	135 $35.00	150 $37.50	175 $41.00	200 $45.00	250 $56.00	200 $45.00
Size of square.......inches	4¼	4¼	4½	4½	5	5	5	5	
Weight each ....pounds Per set of two............	250 $56.00	300 $67.50	300 $67.50	350 $82.50	350 $82.50	400 $90.00	450 $101.00	500 $112.50	

Wrenches 175 pounds and lighter are not fitted with handles and eyes. When ordering, state size and weight desired.

BARRETT SWIVEL WRENCHES

No. 2—IMPROVED

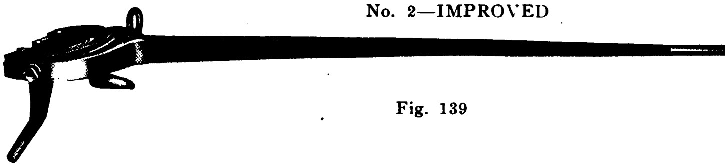


Fig. 139

Fig. 140

These wrenches are made in one size only, but by using the different sizes of extra plates they will fit any square ranging from 3 to 5¼ inches.

Barrett swivel wrench complete for one size square only.......................each	$50.00
Weight each ....pounds	105
Extra plates—3, 3¼, 3½, 3¾, 4, 4¼, 4½, 5, 5¼, 5½..............................each	5.00
Weight each ....pounds	10

PARTS

Fork or handle.................each	$22.00	Pivot bolts (2) ....each	$1.00
Malleable ring with handle...... "	16.00	Eye bolts .... "	2.00
Steel ring with handle.......... "	11.00	Cap screws (3)................. "	.20

LEIDECKER SWIVEL WRENCHES

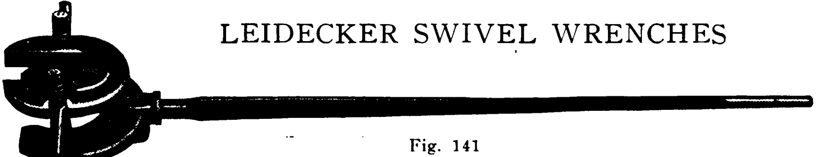


Fig. 141

Size of square ....inches	5
Weight each ....pounds	117
Price ....each	$33.00

These wrenches are furnished for 5-inch squares with a set of 4-inch liners included without extra charge. Extra liners can be furnished for smaller size squares.

PARTS

Outside swivel ring............each	$20.00	Liners (2) ....per set	$2.00
Inside swivel ring............. "	15.00	Eye bolts ....each	1.50
Swivel handle .... "	12.00	Springs .... "	1.00
Wrench handle .... "	10.00		

Drilling Tools

BATES PATENT TONGS

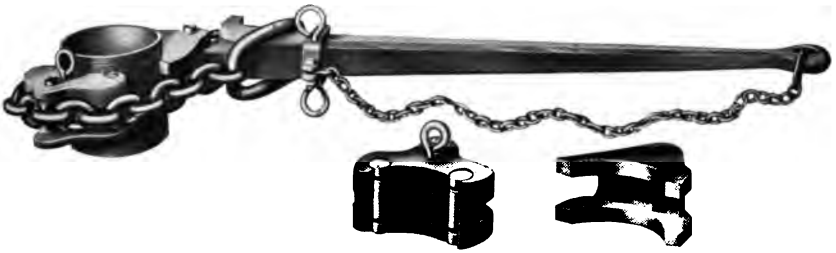


Fig. 142

COMPLETE WITH JAW AND CONCENTRATOR FOR ONE SIZE ONLY.

Size No. 1—For pipe or casing, 7⅝ to 15½ inches, inclusive.
Size No. 2—For pipe or casing, 4 to 6⅝ inches, inclusive.

HANDLES

No. 1—New style, weight, 105 pounds. Each $35.00	No. 2—New style, weight, 80 pounds. Each $32.50

Hangers for handles, weight, 5 pounds.. ....Each $3.75

CHAINS

Size Chain, Inches	Length of Chain, Feet	Weight, Pounds	For Use With Handle	Price, Each	APPLICATION
¾	5	32	No. 1 or No. 2	$ 9.00	Regularly used with No. 2 handles
⅞	6⅓	57	No. 1 or No. 2	12.25	For sizes 12½ inches and smaller
⅞	7	63	No. 1	12.75	For sizes 13½ to 15½ inches inclusive

EXTRA JAW PINS WITH COTTERS

Weight each, 1 pound..............Price each, $0.65

JAWS AND CONCENTRATORS

Size, Inches	Weight of Jaw, Pounds	Weight of Concentrator, Pounds	Price of Jaw, Each	Price of Concentrator, Each
4 or 4½	11	17	$12.00	$10.50
5⅝	12½	25	15.00	11.25
6 or 6¼	13½	25	15.00	11.25
6⅝ or 7	12	25	18.00	11.75
7⅝	22	31	22.50	12.25
8 or 8¼	22	31	22.50	12.25
9⅝ or 10	22	40	27.00	12.50
11⅝ or 12	25	46	30.00	13.00
12½	25	48	33.75	13.25
13½	25	50	33.75	14.00
15½	28	62	37.50	15.25

These tongs can be used without concentrators. A complete set of tongs includes one handle, one chain, jaw and concentrator for each size casing.

KELLERMAN'S CHAIN TONGS

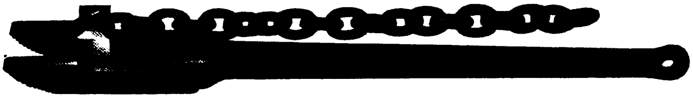


Fig. 143

EXTRA HEAVY PATTERN

For pipe or casing, 4 to 15½ inches, inclusive.

DESCRIPTION	Weight, Pounds	Price
Kellerman's extra heavy chain tongs....................each	220	$56.00
Extra handles .... "	148	29.50
Extra jaws ....per set	32	19.00
Extra chains, ⅞ inch ....each	40	7.50
Extra chains, ¾ inch .... "	30	6.75

Drilling Tools

HARDISON PATENT TONGS

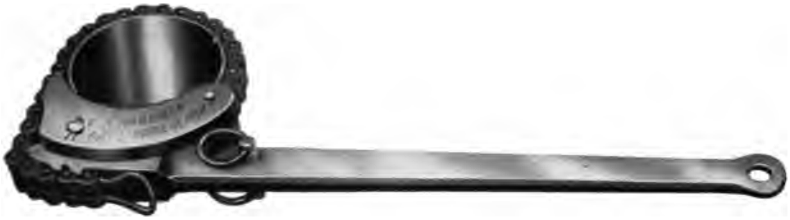


Fig. 144

COMPLETE WITH JAW FOR ONE SIZE ONLY.

Size No. 1—For pipe or casing, 9⅝ to 15½ inches, inclusive.
Size No. 2—For pipe or casing, 4 to 8¼ inches, inclusive.

HANDLES

No. 1—Weight, 115 lbs.....Each $30.00 No. 2—Weight, 115 lbs.....Each $27.50

CHAINS

Length of Chain, Inches	Weight, Pounds	For Use With Handle	Price, Each	APPLICATION
42	47	No. 1	$11.50	For sizes 9⅝ to 12½ inches inclusive
52	60	No. 1	14.00	For sizes 9⅝ to 15½ inches inclusive
32	38	No. 2	9.00	For sizes 4 to 8¼ inches inclusive

JAWS

Size, Inches	Weight, Pounds	Price, Each	Size, Inches	Weight, Pounds	Price, Each
4 or 4½	25	$12.00	9⅝ or 10	65	$27.00
5⅝ or 6	32	15.00	11⅝ or 12	80	30.00
6⅝ or 7	40	18.00	12½ or 13½	90	33.75
7⅝ or 8¼	55	22.50	14 or 15½	100	36.00

PARTS

Symbol Number	NAME OF PART	Price, Each	Symbol Number	NAME OF PART	Price, Each
3	Jaw pin	$0.50	8	Hanger eye bolt	$0.50
4	Jaw springs	.25		Links to connect chain to jaw	1.00
6	Chain pin	.25			
7	Dies	.25		Chain handle	.50

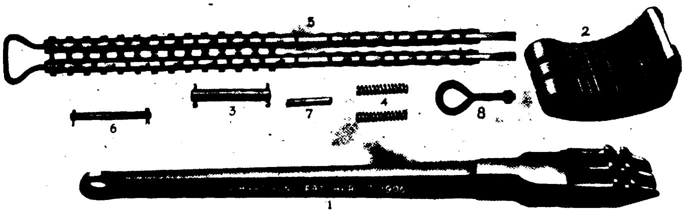


Fig. 145

No. 1—Handle.
No. 2—Jaw.
No. 3—Jaw pin.
No. 4—Jaw springs.
No. 5—Double flat link chain.
No. 6—Chain pin.
No. 7—Dies.
No. 8—Hanger eye bolt.

Drilling Tools

MADDREN PATENT TONGS

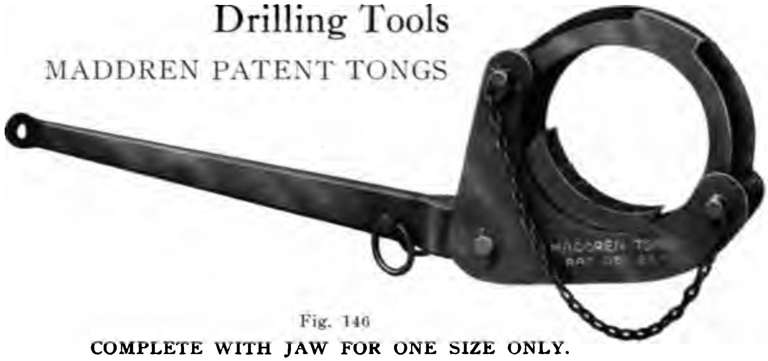


Fig. 146

COMPLETE WITH JAW FOR ONE SIZE ONLY.

Size No. 1—For pipe or casing, 9⅝ to 12½ inches, inclusive.
Size No. 2—For pipe or casing, 4½ to 8¼ inches, inclusive.

HANDLES AND JAWS COMPLETE

DESCRIPTION	Weight, Pounds	Price, Each
No. 1—Handle	100	$30.00
Jaws complete, 9⅝ or 10 inch	180	75.00
Jaws complete, 11⅝ or 12½ inch	230	85.00
No. 2—Handle	100	25.00
Jaws complete, 6⅝ inch or smaller	75	56.00
Jaws complete, 7⅝, 8 or 8¼ inch	90	69.00

PARTS

Symbol Number	NAME OF PART	SIZE IN INCHES						
		6⅝	7⅝	8¼	9⅝	10	11⅝	12½
2	Jaw frame each	$16.00	$20.00	$20.00	$21.00	$21.00	$26.00	$26.00
3	Jaw frame pin "	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	Jaw "	14.40	17.40	17.40	19.20	19.20	20.00	20.00
5	Dies "	.70	.70	.70	.70	.70	.70	.70
	Dies to the set "	(4)	(4)	(4)	(5)	(5)	(6)	(6)
6	Jaw pin "	.20	.20	.20	.20	.20	.20	.20
7	Strap "	19.00	25.00	25.00	27.50	27.50	31.00	31.00
8	Hanger pin with rings "	4.00	4.00	4.00	4.00	4.00	4.00	4.00
9	Draw pin "	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	Fixed pin and chain "	1.60	1.60	1.60	1.60	1.60	1.60	1.60

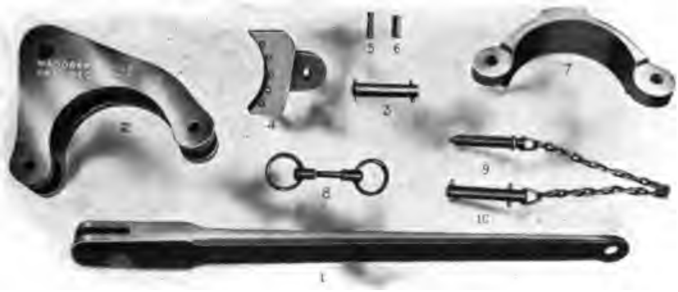


Fig. 147

No. 1—Handle.
No. 2—Jaw frame.
No. 3—Jaw frame pin (2 cotters).
No. 4—Jaw.
No. 5—Dies.
No. 6—Jaw pin.
No. 7—Strap.
No. 8—Hanger pin with rings.
No. 9—Draw pin.
No. 10—Fixed pin with cotter and chain.

Fishing Tools

FOR CABLE SYSTEM

COMBINATION SOCKET

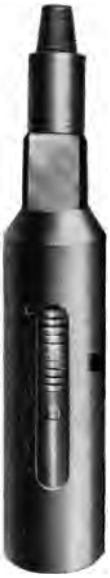


Fig. 148

SLIPS

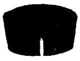


Fig. 149

COMBINATION SOCKET WITH BOWL

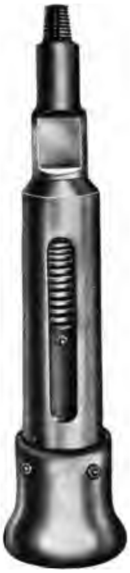


Fig. 150

COMBINATION SOCKETS

WITH TWO SETS OF SLIPS

To catch either a pin or neck of rope socket.

For size hole...inches	4½	5	5⅝	6¼	6⅝	7⅝
Size of pin.....inches	1¾x2¾	2x3	2x3	2x3	2x3	2x3
Threads per inch.....	8	7	7	7	7	7
Weight ....pounds	90	100	120	135	170	225
Price ....each	$58.75	65.00	67.50	70.00	73.75	80.00
Extra slips ....per set	6.25	7.00	7.50	8.00	8.75	9.50
For size hole...inches	7⅝	8¼	9⅝	10	11⅝	12½
Size of pin......inches	3x4	3x4	3x4	3x4	3x4	3x4
Threads per inch.....	7	7	7	7	7	7
Weight ....pounds	290	300	500	525	800	1075
Price ....each	$83.75	87.50	105.00	109.50	148.75	165.00
Extra slips ....per set	9.50	10.00	12.00	12.50	15.00	17.50

When ordering, state size of tool socket is required to catch.

COLLAR SOCKETS

To take hold of the collar of a tool.

For size hole......inches	4½	5	5⅝	6¼	6⅝
Size of pin.........inches	1¾x2¾	2x3	2x3	2x3	2x3
Threads per inch........	8	7	7	7	7
Weight ....pounds	80	90	125	175	190
Price ....each	$50.00	$52.50	$55.00	$60.00	$65.00

For size hole......inches	7⅝	8¼	9⅝	10
Size of pin ....inches	3x4	3x4	3x4	3x4
Threads per inch........	7	7	7	7
Weight ....pounds	225	250	325	350
Price ....each	$95.00	$105.00	$120.00	$130.00

When ordering, state size of tool socket is required to catch.

COLLAR SOCKET

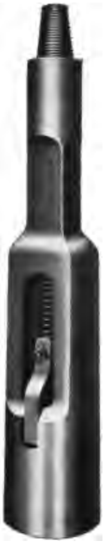


Fig. 151

HORN SOCKET

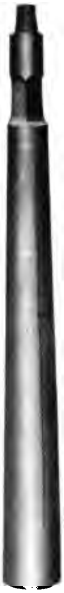


Fig. 152

HORN SOCKETS

To take a friction hold of a loose tool in the well.

For size hole....inches	4½	5	5⅝	6¼	6⅝
Size of pin......inches	1¾x2¾	2x3	2x3	2x3	2x3
Threads per inch......	8	7	7	7	7
Weight ....pounds	75	100	140	175	200
Price ....each	$25.00	$32.50	$40.00	$48.00	$50.00
For size hole.....inches	7	7⅝	8¼	9	9⅝
Size of pin......inches	3x4	3x4	3x4	3x4	3x4
Threads per inch......	7	7	7	7	7
Weight ....pounds	230	260	285	335	360
Price ....each	$52.50	$55.00	$58.00	$62.50	$66.50
For size hole.....inches	10	11	11⅝	12½	...
Size of pin......inches	3x4	3x4	3x4	3x4	...
Threads per inch......	7	7	7	7	...
Weight ....pounds	385	400	420	450	...
Price ....each	$70.00	$78.50	$87.50	$95.00	...

When ordering, state size of tool socket is required to catch. For bowls adapting any of the above sockets to larger size holes, see Page 65.

Fishing Tools

FOR CABLE SYSTEM

SLIP SOCKETS

WITH TWO SETS OF SLIPS

To take hold of a lost tool in the well.

SLIP SOCKET

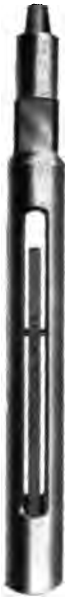


Fig. 153

SLIPS

Fig. 154

For size hole.......inches	4½	5	5⅝	6¼
Size of pin.........inches	1¾x2¾	2x3	2x3	2x3
Threads per inch.........	8	7	7	7
Weight ....pounds	100	125	150	200
Price ....each	$56.25	$62.50	$63.75	$70.00
Extra slips........per set	6.25	7.00	7.50	7.75
For size hole.......inches	6⅝	7⅝	7⅝	8¼
Size of pin.........inches	2x3	2x3	3x4	3x4
Threads per inch.........	7	7	7	7
Weight ....pounds	225	275	350	400
Price ....each	$72.50	$78.25	$81.25	$85.75
Extra slips........per set	8.00	8.75	8.75	9.00
For size hole.......inches	9⅝	10	11⅝	12½
Size of pin.........inches	3x4	3x4	3x4	3x4
Threads per inch.........	7	7	7	7
Weight ....pounds	550	650	850	1100
Price ....each	$100.00	$104.50	$137.50	$152.50
Extra slips........per set	10.50	11.25	13.25	14.50

WHEN ORDERING, STATE SIZE SOCKET IS REQUIRED TO CATCH.

SLIP SOCKET WITH BOWL

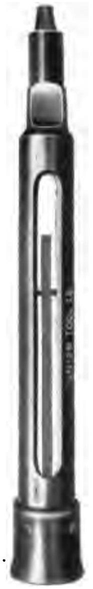


Fig. 155

SOCKET BOWLS

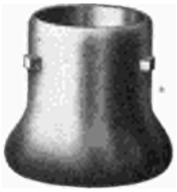


Fig. 156

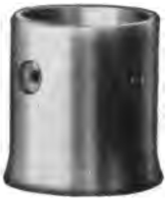


Fig. 157

With the use of these bowls all kinds of sockets can be adapted for working in larger size holes.

Size socket ....inches	4½	4½	4½	5	5⅝	5⅝	6¼	6⅝
Size of bowl.............inches	5⅝	6¼	6⅝	7	6⅝	7⅝	8¼	8¼
Weight ....pounds	12	12	12	16	18	18	20	24
Price ....each	$9.00	$9.50	$10.00	$11.00	$11.50	$12.00	$12.50	$12.50
Size socket ....inches	7	7⅝	8¼	8¼	9	9⅝	9⅝	10
Size of bowl.............inches	9	9⅝	10	12½	11	11⅝	13½	12½
Weight ....pounds	25	32	40	40	45	68	68	72
Price ....each	$13.75	$15.00	$16.00	$17.50	$17.00	$18.00	$22.50	$21.00
Size socket ....inches	10	10	10	11⅝	11⅝	11⅝	12½	12½
Size of bowl.............inches	13½	14½	15½	13½	14½	15½	14½	15½
Weight ....pounds	72	85	85	100	100	100	105	105
Price ....each	$22.50	$23.75	$25.00	$23.00	$25.00	$27.50	$28.00	$31.50

Add the above prices to sockets when bowls are furnished.

Fishing Tools

FOR CABLE SYSTEM

TWO SLIP

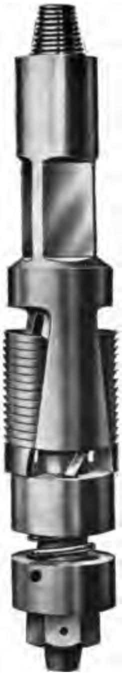


Fig. 158

FOX TRIP CASING SPEARS

For Removing Casing from the Well

If after the spear takes hold and the casing cannot be taken out, the spear can be released by lowering the tools on it. This releases the slips, and the spear may then be withdrawn.

FOUR SLIP

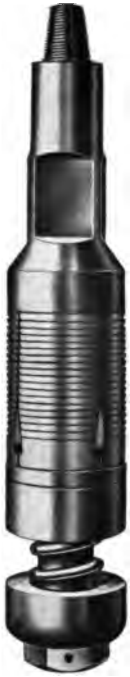


Fig. 159

TWO SLIP

For size casing............inches	4½	5	5 3/16	5⅝	6¼	6⅝	7⅝
Size of pin................inches	1¾x2¾	2x3	2x3	2x3	2x3	2x3	3x4
Number of threads per inch......	8	7	7	7	7	7	7
Weight ....pounds	90	125	140	150	230	250	350
Price ....each	$95.00	$110.00	$120.00	$125.00	$125.00	$135.00	$150.00

For size casing............inches	8¼	9⅝	10	11⅝	12½	13½	......
Size of pin................inches	3x4	3x4	3x4	3x4	3x4	3x4	......
Number of threads per inch......	7	7	7	7	7	7	......
Weight ....pounds	385	450	475	600	750	900	......
Price ....each	$160.00	$180.00	$195.00	$220.00	$230.00	$260.00	......

FOUR SLIP

For size casing..inches	4½	6¼	6⅝	7⅝	8¼	9⅝	10	11⅝	12½
Size of pin.......inches	1¾x2¾	2x3	2x3	3x4	3x4	3x4	3x4	3x4	3x4
Number threads per inch	8	7	7	7	7	7	7	7	7
Weight ....pounds	125	325	350	490	540	625	650	875	1070
Price ....each	$150.00	175.00	187.50	200.00	200.00	237.00	237.00	265.00	295.00

When ordering, state size of pin; style of taper; number of threads to the inch (flat or sharp); size of wrench square; also diameter of hole in which tool is to be used.

Fishing Tools

FOR CABLE SYSTEM

MILLS PULL-UP CASING SPEARS

TWO SLIP

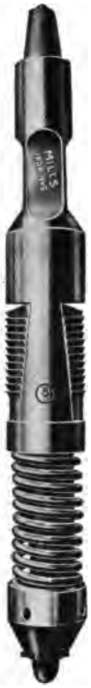


Fig. 160
Showing Spear
Tripped

FOUR SLIP

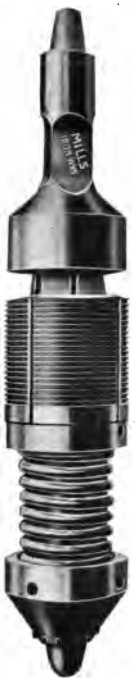


Fig. 161
Showing Spear Ready
for Entering Casing

FOUR SLIP

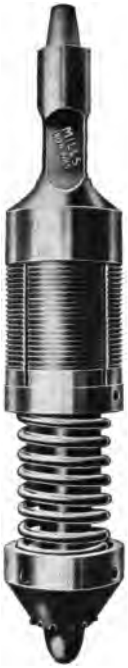


Fig. 162
Showing Spear
Tripped

YOKE FOR
SETTING SPEAR

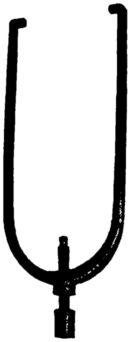


Fig. 163

These spears are used for pulling casing from the well and have positive trip and latch for holding slips in contracted position when spear is tripped for removing from well.

Trip is enclosed in body of spear so that sand and dirt cannot impair its action.

TWO SLIP

For size casing...inches	4	4½	5	5 3/16	5⅝	6¼	6⅝	7⅝
Size of pin.......inches	1⅝x2½	1¾x2¾	2x3	2x3	2x3	2x3	2x3	3x4
Number threads per inch	8	8	7	7	7	7	7	7
Weight ....pounds	90	125	150	175	200	225	285	425
Price ....each	$85.00	$95.00	$110.00	$120.00	$125.00	$125.00	$135.00	$150.00
For size casing...inches	8¼	9⅝	10	11⅝	12½	13½	14½	15½
Size of pin.......inches	3x4	3x4	3x4	3x4	3x4	3x4	3x4	3x4
Number threads per inch	7	7	7	7	7	7	7	7
Weight ....pounds	470	625	660	1000	1100	1350	1650	2000
Price ....each	$160.00	$180.00	$195.00	$220.00	$230.00	$260.00	$300.00	$350.00

FOUR SLIP

For size casing..inches	7⅝	8¼	9⅝	10	11⅝	12½	13½	14½	15½
Size of pin.......inches	3x4	3x4	3x4	3x4	3x4	3x4	3x4	3x4	3x4
Number threads per inch	7	7	7	7	7	7	7	7	7
Weight ....pounds	425	470	625	660	1000	1100	1350	1650	2000
Price ....each	$200.00	200.00	237.00	237.00	265.00	295.00	340.00	385.00	420.00

When ordering, state size of pin; style of taper; number of threads to the inch (flat or sharp); size of wrench square; also diameter of hole in which tool is to be used.

Fishing Tools

FOR CABLE SYSTEM

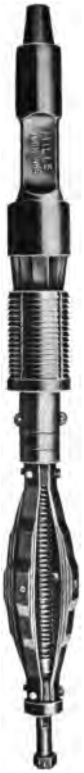


Fig. 164
Showing Spear Ready for Entering Casing

MILLS DRIVE-DOWN CASING SPEARS

These Spears are used to drive casing when stuck and cannot be loosened from the top of the well. The Spear is lowered into the well to the point where the casing is fast and it is loosened by jarring down on the spear.

These spears are all made with four slips and do not oblong the casing.

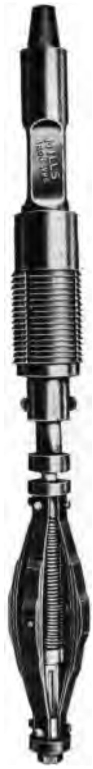


Fig. 165
Showing Spear With Slips Expanded

For size casing...inches	4	4½	5	5 3/16	5⅝	6¼	6⅝	7⅝
Size of pin.......inches	1⅝x2½	1¾x2¾	1¾x2¾	1¾x2¾	2x3	2x3	2x3	3x4
Number threads per inch	8	8	8	8	7	7	7	7
Weight ....pounds	90	115	125	130	190	215	275	400
Price ....each	$130.00	$150.00	$160.00	$165.00	$170.00	$175.00	$187.50	$200.00
For size casing...inches	8¼	9⅝	10	11⅝	12½	13½	14½	15½
Size of pin.......inches	3x4	3x4	3x4	3x4	3x4	3x4	3x4	3x4
Number threads per inch	7	7	7	7	7	7	7	7
Weight ....pounds	440	600	640	950	1000	1200	1450	1800
Price ....each	$200.00	$ 237.00	$237.00	$265.00	$295.00	$340.00	$380.00	$420.00

When ordering, state size of pin; style of taper; number of threads to the inch (flat or sharp); size of wrench square; also diameter of hole in which tool is to be used.

Fishing Tools

FOR CABLE SYSTEM

CASING SWEDGES

For Straightening Bulged or Dented Pipe in the Well

FORGED STEEL

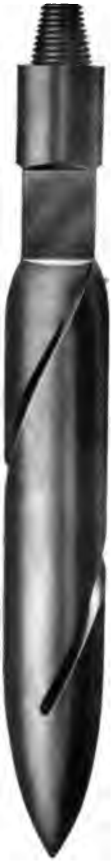


Fig. 166

FORGED STEEL WITH FLUTED WATER COURSE

For Size Casing, Inches	Size Pin, Inches	Threads Per Inch	Weight, Pounds	Price, Each
4½	1¾x2¾	8	90	$ 22.50
5	2 x3	7	150	28.00
5⅝	2 x3	7	175	35.00
6¼	2 x3	7	200	39.50
6⅝	2 x3	7	225	43.00
7⅝	3 x4	7	300	54.50
8¼	3 x4	7	390	59.25
9⅝	3 x4	7	500	78.00
10	3 x4	7	580	81.75
11⅝	3 x4	7	750	97.50
12½	3 x4	7	900	108.75

CAST IRON WITH FLUTED WATER COURSE

For Size Casing, Inches	Size Pin, Inches	Threads Per Inch	Weight, Pounds	Price, Each
13½	3x4	7	1200	$140.50
14½	3x4	7	1350	150.00
15½	3x4	7	1525	159.50
16	3x4	7	1600	162.75
17	3x4	7	1700	168.75
18½	3x4	7	2060	197.00

When ordering, state size of pin; style of taper; number of threads to the inch (flat or sharp); size of wrench square; also diameter of hole in which tool is to be used.

CAST IRON

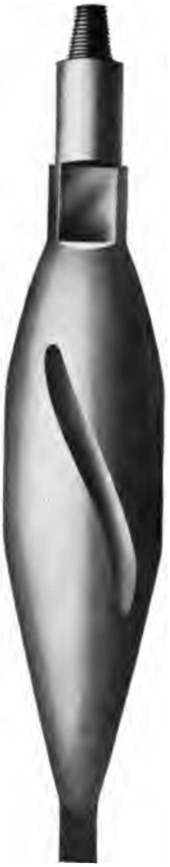


Fig. 167

Fishing Tools

FOR CABLE SYSTEM

ROPE SPEAR

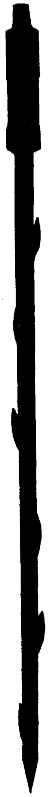


Fig. 168

TWO-PRONG ROPE GRAB

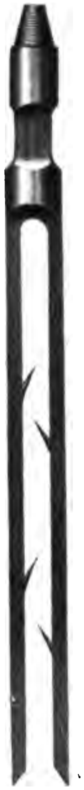


Fig. 169

THREE-PRONG ROPE GRAB

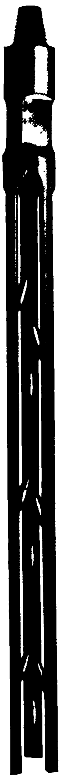


Fig. 170

Used for removing broken cable or rope from well.

For Size Hole, Inches	Size Pin, Inches	Threads Per Inch	Rope Spear		Two-Prong Rope Grab		Three-Prong Rope Grab	
			Weight, Pounds	Price, Each	Weight, Pounds	Price, Each	Weight, Pounds	Price, Each
4½	1⅝x2½	8	100	$20.00	90	$28.00	125	$35.00
5	2 x3	7	120	22.50	110	30.00	150	37.50
5⅝	2 x3	7	135	25.00	130	31.25	175	39.00
6¼	2 x3	7	150	28.00	150	33.50	200	41.50
6⅝	2 x3	7	175	31.00	170	34.50	225	42.50
7⅝	3 x4	7	200	33.00	190	35.50	275	44.00
8¼	3 x4	7	275	37.50	210	38.75	300	48.50
9⅝	3 x4	7	325	42.50	250	43.75	375	55.00
10	3 x4	7	350	45.00	275	48.50	400	60.00
11⅝	3 x4	7	...	.....	315	53.00	450	67.50
12½	3 x4	7	...	.....	350	59.50	500	75.00

When ordering, state size of pin; style of taper; number of threads to the inch (flat or sharp); size of wrench square; also diameter of hole in which tool is to be used.

Fishing Tools

FOR CABLE SYSTEM

V ROPE KNIFE

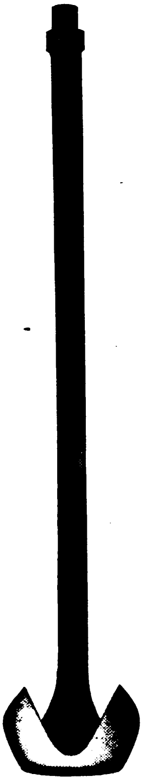


Fig. 171

HORSE SHOE TRIP KNIFE

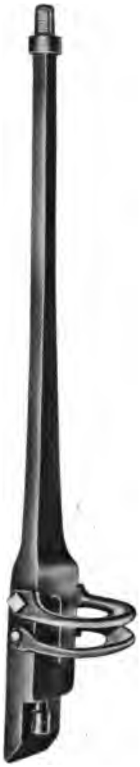


Fig. 172

ROPE KNIFE SINKER

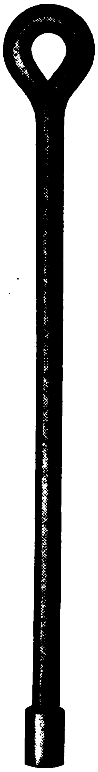


Fig. 173

SUCKER ROD JARS

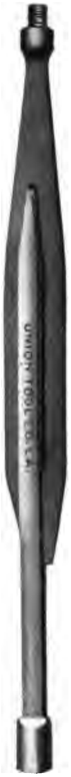


Fig. 174

V ROPE KNIFE

For cutting manila rope.................................Weight, 15 pounds.............Price each $15.00

HORSE SHOE TRIP ROPE KNIFE

For cutting off manila cable close to the socket. The knife does not close until the trip strikes the socket barrel.

For cutting manila rope.................................Weight, 23 pounds.............Price each $22.50

ROPE KNIFE SINKER

Used with sand line fastened in the eye, jars and rope knife screwed to lower end. Rope knifes may be used either on a string of sucker rods or a sand line. When the latter is used rope knife sinkers and jars are necessary.

Weight, 20 pounds...Price each $4.50

ROPE KNIFE OR SUCKER ROD JARS

Attached to rope knife for cutting rope in the well.

Weight, 25 pounds...Price each $10.00

Fishing Tools

FOR CABLE SYSTEM

CASING SPLITTER

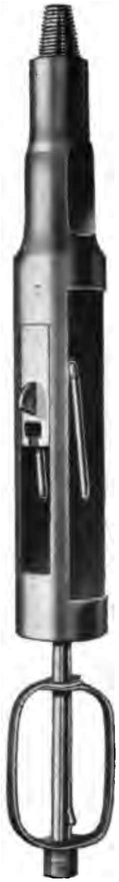


Fig. 175

CASING SPLITTERS

For splitting the casing to allow the sediment around it to run into the well, so that the casing may be removed.

For Size Casing, Inches	Size Pin, Inches	Threads Per Inch	Weight, Pounds	Price, Each
4½	1¾x2¾	8	125	$120.00
5	2 x3	7	150	130.00
5⅝	2 x3	7	175	145.00
6¼	2 x3	7	240	160.00
6⅝	2 x3	7	275	165.00
7⅝	3 x4	7	400	180.00
8¼	3 x4	7	435	200.00
9⅝	3 x4	7	525	275.00
10	3 x4	7	550	300.00
11⅝	3 x4	7	750	350.00
12½	3 x4	7	850	400.00

CASING PERFORATOR

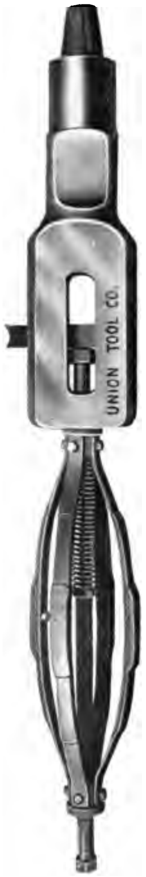


Fig. 176

CASING PERFORATORS

For perforating casing in the well.

For Size Casing, Inches	Size Pin, Inches	Threads Per Inch	Weight, Pounds	Price, Each
4½	1¾x2¾	8	100	$150.00
5	2 x3	7	125	165.00
5⅝	2 x3	7	150	180.00
6¼	2 x3	7	175	190.00
6⅝	2 x3	7	195	200.00
7⅝	3 x4	7	300	240.00
8¼	3 x4	7	325	250.00
9⅝	3 x4	7	475	320.00
10	3 x4	7	500	350.00
11⅝	3 x4	7	675	450.00
12½	3 x4	7	750	500.00

When ordering, state size of pin; style of taper; number of threads to the inch (flat or sharp); size of wrench square; also diameter of hole in which tool is to be used.

Fishing Tools

FOR CABLE SYSTEM

IMPROVED PATTERN

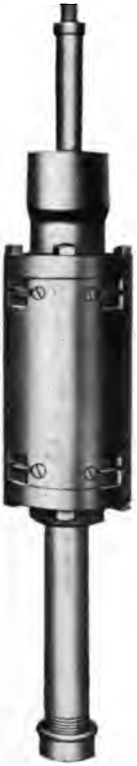


Fig. 177

CASING CUTTERS

IMPROVED PATTERN—WITH MANDRELS

For cutting casing at any point in the well when the entire string of casing cannot be drawn out. This is an improved pattern, having a long body with a set of rollers to guide the cutters in making a perfectly straight cut, eliminating all possibility of the casing being cut off crooked, or the cutters becoming wedged. Used on tubing.

For Size Casing, Inches	Weight, Pounds	Price, Each	For Size Casing, Inches	Weight, Pounds	Price, Each
4½	65	$200.00	8¼	200	$240.00
5	75	205.00	9⅝	275	275.00
5⅝	100	215.00	10	290	300.00
6¼	130	220.00	11⅝	380	350.00
6⅝	140	225.00	12½	485	380.00
7⅝	175	235.00			

Casing cutter sinkers........................each $18.00
Casing cutter jars.......................... " 15.00

REGULAR PATTERN—WITH MANDRELS

For Size Casing, Inches	Weight, Pounds	Price, Each	For Size Casing, Inches	Weight, Pounds	Price, Each
4½	30	$28.25	8¼	85	$45.00
5	35	30.00	9⅝	95	50.00
5⅝	40	33.25	10	105	57.50
6¼	50	35.00	11⅝	125	65.00
6⅝	60	37.50	12½	150	70.00
7⅝	70	40.75			

Casing cutter sinkers........................each $9.00
Casing cutter jars.......................... " 7.50

When ordering, state size of tubing they are to run on, also diameter of hole in which tool is to be used.

REGULAR PATTERN

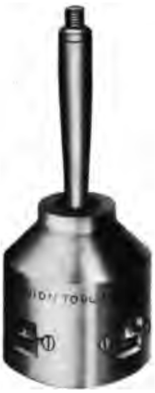


Fig. 178

COMBINATION CASING NIPPLES

ALSO CALLED

MALE AND FEMALE NIPPLES OR FORGED STEEL NIPPLES

For re-cutting threads on casing or couplings while in the well.

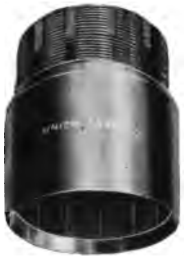


Fig. 179

For Size Casing, Inches	Weight, Pounds	Price, Each	For Size Casing, Inches	Weight, Pounds	Price, Each
4½	25	$12.50	9	65	$22.50
5	27	13.50	9⅝	70	23.50
5⅝	30	15.00	10	75	24.50
6¼	35	17.50	11	80	25.00
6⅝	38	18.00	11⅝	85	26.00
7	45	19.00	12½	90	27.50
7⅝	50	20.00	13½	100	31.00
8¼	53	21.00			

When ordering, state size and weight of casing, number of threads to the inch, also diameter of hole in which tool is to be used.

Fishing Tools

FOR CABLE SYSTEM

SPUD

Fig. 180

SPUDS—8 FT. LONG

For straightening a string of tools in the hole, also for spudding around and loosening a bit or reamer when fast in the well.

For size hole................inches	4½	5⅝	6¼	6⅝	7⅝	7⅝
Size of pin...................inches	1¾x2¾	2x3	2x3	2x3	2x3	3x4
Threads per inch..................	8	7	7	7	7	7
Weight ....pounds	125	150	175	200	250	325
Price ....each	$22.50	$35.75	$36.75	$38.25	$50.00	$52.00
For size hole................inches	8¼	9⅝	10	11⅝	12½	13½
Size of pin...................inches	3x4	3x4	3x4	3x4	3x4	3x4
Threads per inch..................	7	7	7	7	7	7
Weight ....pounds	400	525	560	650	700	750
Price ....each	$56.25	$62.50	$68.75	$93.75	$107.50	$112.50

WALL OR BIT HOOK

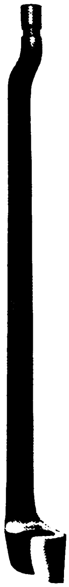


Fig. 181

WALL OR BIT HOOKS

TO RUN ON TUBING

To loosen tools from the side of the well and remove them.

For size hole...inches	4½	5	5⅝	6¼	6⅝	7⅝	8¼	9⅝
Size material...inches	¾x3	⅞x3	1x3	1x3½	1x3½	1¼x4	1¼x4	1¼x5
Length ....feet	6	6	6	8	8	10	10	10
Weight ....pounds	75	80	100	140	150	200	225	275
Price ....each	$20.00	$21.50	$23.00	$25.00	$26.00	$27.00	$28.50	$30.00
For size hole...inches	10	11⅝	12½	13½	14½	15½	16	.....
Size material...inches	1¼x5	1¼x6	1½x6	1½x6	1½x6	2x6	2x6	.....
Length ....feet	10	10	10	10	10	10	10	......
Weight ....pounds	300	340	375	400	425	480	500	.....
Price ....each	$31.50	$35.00	$37.50	$39.00	$41.00	$43.00	$45.00	.....

Can be furnished with tool joints. Prices upon application.

SIDE RASP

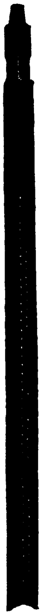


Fig. 182

SIDE RASPS

Used for filing off the collar on lost tools so that a fishing tool can take hold.

For size hole................inches	4½	5	5⅝	6¼	6⅝	7⅝
Size of pin...................inches	1¾x2¾	2x3	2x3	2x3	2x3	3x4
Threads per inch..................	8	7	7	7	7	7
Weight ....pounds	125	140	150	175	200	325
Price ....each	$34.00	$43.50	$54.00	$55.00	$57.50	$78.00
For size hole................inches	8¼	9⅝	10	11⅝	12½	......
Size of pin...................inches	3x4	3x4	3x4	3x4	3x4	......
Threads per inch..................	7	7	7	7	7	......
Weight ....pounds	400	425	560	650	750	......
Price ....each	$84.50	$94.00	$103.00	$141.00	$161.00	......

Fishing Tools

FOR CABLE SYSTEM

BOOT OR LATCH JACK

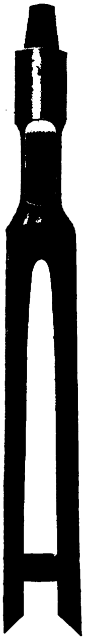


Fig. 183

JAR KNOCKER

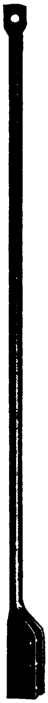


Fig. 184

TUBING SPEAR WITH SOCKET AND BOWL

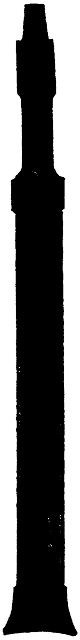


Fig. 185

COMMON TUBING SPEAR

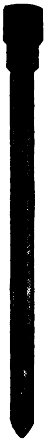


Fig. 186

BOOT JACKS OR LATCH JACKS

To take hole of lower half of jar under head when upper half is broken off, also used as a bailer grab.

For size hole.......inches	4½	5	5⅝	6¼	6⅝	7⅝	8¼
Size of pin ....inches	1¾x2¾	2x3	2x3	2x3	3x4	3x4	3x4
Threads per inch.........	8	7	7	7	7	7	7
Weight ....pounds	65	75	90	110	175	190	200
Price ....each	$19.50	$22.50	$25.00	$27.50	$32.50	$35.00	$37.50

JAR KNOCKERS

To knock jars loose when locked together in well.

Length ....feet	8 to 10	12	14	16	18	20	24
Weight ....pounds	190	215	240	265	290	315	345
Price ....each	$48.00	$52.50	$58.00	$63.00	$68.00	$78.50	$84.00

TUBING SPEARS WITH SOCKET AND BOWL

To take out tubing when unscrewed or broken off. Will run in different sizes of casing.

For size tubing...inches	2	2½	3
Weight..........pounds	115	125	150
Price ....each	$70.00	$75.00	$83.00

COMMON TUBING SPEARS WITHOUT SOCKET

To take out tubing when unscrewed or broken off.

For size tubing...inches	2	2½	3
Weight..........pounds	40	50	70
Price ....each	$18.50	$20.50	$23.00

Hydraulic
Rotary Drilling Equipment

Pages 76 to 91 Inclusive

Hydraulic Rotary Rig

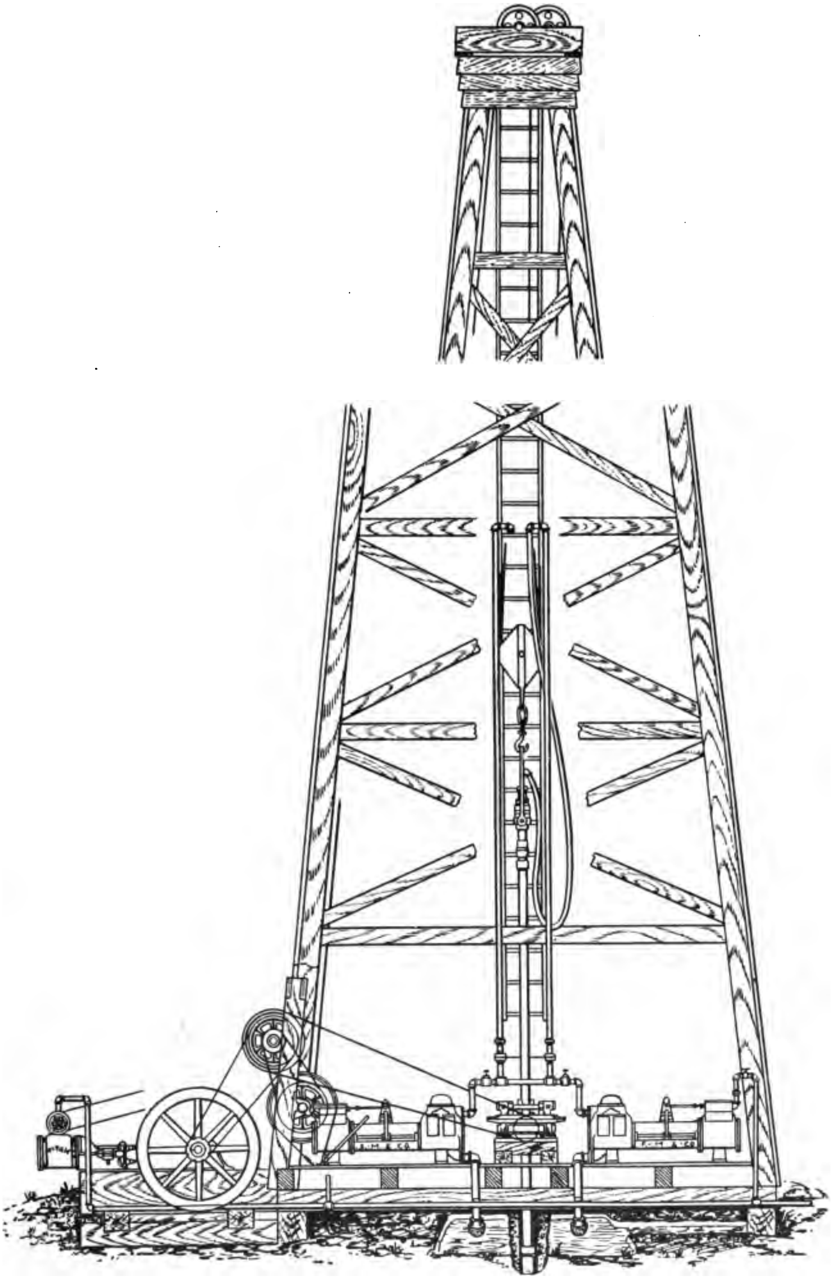


Fig. 187

Hydraulic Rotary Rig

TIMBER AND LUMBER REQUIRED TO BUILD A COMPLETE RIG
DERRICK 106 FEET HIGH WITH BASE 24 FEET SQUARE

Pieces	Size, Inches	Length, Feet	OREGON PINE	Feet
1	22x24	9	Engine block	396
2	14x14	16	Mud sills	523
2	14x14	12	Pony sills	392
1	14x14	20	Blocking	327
2	14x14	24	Casing sills	784
1	12x12	20	Blocking	240
1	12x12	14	Bumpers	168
2	10x10	26	Side sills	433
8	8x8	24	Derrick sills	1024
4	8x8	20	Casing sills and blocking	427
2	6x6	20	Dead men	120
6	6x6	18	Pump foundation	324
2	6x16	16	Crown block	256
72	2x12	24	Floor girts and doublers	3456
8	2x12	22	Girts	352
4	2x12	20	Girts	160
8	2x12	18	Girts	288
4	2x12	16	Girts	128
23	2x12	20	Derrick foundation and top of derrick	920
12	2x12	18	Derrick foundation	432
4	2x10	26	Starting legs	173
4	2x10	18	Starting legs	120
54	2x10	16	Derrick legs	1440
4	2x10	18	Top of derrick	120
8	2x8	24	First set braces	256
8	2x8	22	Second set braces	235
8	2x8	20	Third set braces	213
8	2x6	20	Fourth set braces	160
8	2x6	18	Fifth set braces	144
8	2x6	16	Sixth set braces	128
30	2x4	16	Ladders and to cut up	320
50	1x12	24	Siding	1200
75	1x12	20	Siding	1500
50	1x12	16	Siding	800
70	1x6	16	Braces and ladder steps	560
			Total Oregon Pine	18519
			HARDWOOD	
1	5x6	16	Oak top of crown block	40
1	5x6	14	Oak top of crown block	35
			Total Hardwood	75

Combination Rig

FOR CABLE AND ROTARY DRILLING SYSTEMS
TIMBER AND LUMBER REQUIRED TO BUILD A COMPLETE RIG
DERRICK 106 FEET HIGH WITH BASE 24 FEET SQUARE

Pieces	Size, Inches	Length, Feet	OREGON PINE	Feet
1	14x14x14x30	26	Walking beam	910
2	22x24	9	Engine blocks	792
1	16x16	30	Main sill	640
1	16x16	20	Sub sill	427
1	16x16	16	Sampson post	341
1	16x16	14	Jack post	299
4	14x14	16	Mud sills for engine blocks	1045
4	14x14	16	Mud sills for derrick	1045
1	14x14	12	Nose sill	196
2	14x14	20	Casing sills	653
1	14x14	20	Blocking	327
1	14x14	16	Tail sill and post	261
4	14x14	12	Pony sills for engine blocks	784
2	12x12	24	Bull wheel and calf wheel posts	576

Concluded on following page.

Combination Rig—(Concluded)

1	12x12	12	Back brake and blocking	144
1	12x12	14	Bumpers on top of derrick	168
2	10x10	26	Side sills	433
1	8x8	26	Bunting pole	139
8	8x8	24	Derrick sills	1024
2	8x8	24	Cross sills under derrick sills to set rotary table on	256
4	8x8	20	Casing rack and blocking	427
2	6x6	20	Dead men	120
2	6x6	22	To swing derrick roof on	132
5	6x6	18	Jack post braces and foundation for pumps	270
6	6x6	14	Back brake, headache post, Sampson post and bull wheel braces	252
5	4x6	16	Calf wheel and short braces	160
2	6x16	16	Crown block	256
1	5x16	12	Knuckle post	80
1	6x6x6x16	12	Pitman	96
1	5x5x5x14	12	Swing lever	70
14	2x12	20	Band wheel centers (S.1.S.)	560
74	2x12	24	Derrick floor, girts and doublers	3552
12	2x12	22	Girts and outside girts	528
17	2x12	20	Foundations for derrick corners	680
8	2x12	18	Foundations for derrick corners	288
4	2x12	20	Short doublers	160
12	2x12	20	Girts, outside girts and top of derrick	480
12	2x12	18	Girts and outside girts	432
4	2x12	16	Outside girts	128
4	2x12	12	Outside girts	96
6	2x10	26	Starting legs and belt house sills	260
4	2x10	18	Starting legs	120
54	2x10	16	Derrick legs and to cut up	1440
1	2x8	24	Bunting pole to jack post	32
12	2x8	18	Derrick roof and to cut up	288
1	2x8	20	Derrick roof	27
8	2x8	26	Outside braces	277
8	2x8	24	Outside braces	256
8	2x8	22	Outside braces	235
8	2x8	20	Outside braces	213
16	2x8	18	Outside braces	384
5	2x6	26	Belt house frame	130
8	2x6	24	First set braces	192
8	2x6	22	Second set braces	176
8	2x6	20	Third set braces	160
8	2x6	20	Fourth set braces	160
8	2x6	18	Fifth set braces	144
12	2x6	16	To cut up	192
2	2x6	14	Engine house frame	28
3	2x6	12	Engine house frame	36
3	2x4	14	Engine house frame	28
3	2x4	12	Engine house frame	24
2	2x4	20	Center of derrick roof	27
30	2x4	16	Ladders and to cut up	320
40	1x12	24	Siding	960
30	1x12	20	Siding	600
75	1x12	18	Siding	1350
146	1x12	16	Girts and siding	2336
50	1x12	14	Siding	700
60	1x12	12	Siding	720
70	1x6	16	Braces and ladder steps	560
4	3x12	18	Bull wheel arms—S.4.S. 2½"x11"	216
2	3x12	16	Calf wheel arms—S.4.S. 2½"x11"	96
			Total Oregon Pine	31914
			1—Set band wheel cants for 10-foot wheel	
			1—Set tug pulley cants for 6-foot wheel	
			1—Set bull wheel cants, arms and handles for 7½-foot wheel	
			1—Set calf wheel cants, arms and handles for 7-foot wheel	
			HARDWOOD	
1	16x16	16	Oak bull wheel shaft	341
1	16x16	6	Oak calf wheel shaft	128
1	6x6	16	Oak top of crown block	48
1	6x6	14	Oak top of crown block	42
1	2x12	16	Oak top of beams and dog	32
			Total Hardwood	591

Hydraulic Rotary Drilling Equipment

THE IDEAL ROTARY MACHINE

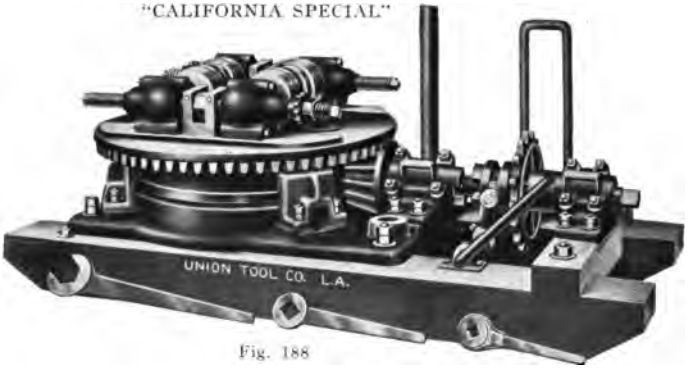


Fig. 188

Designed and built extra strong and heavy to withstand the hardest usage and wear.

Size Pipe Machine Will Handle	Weight in Pounds	Price
2 to 18 inches	6152	Upon application
2 to 20 inches	6192	Upon application

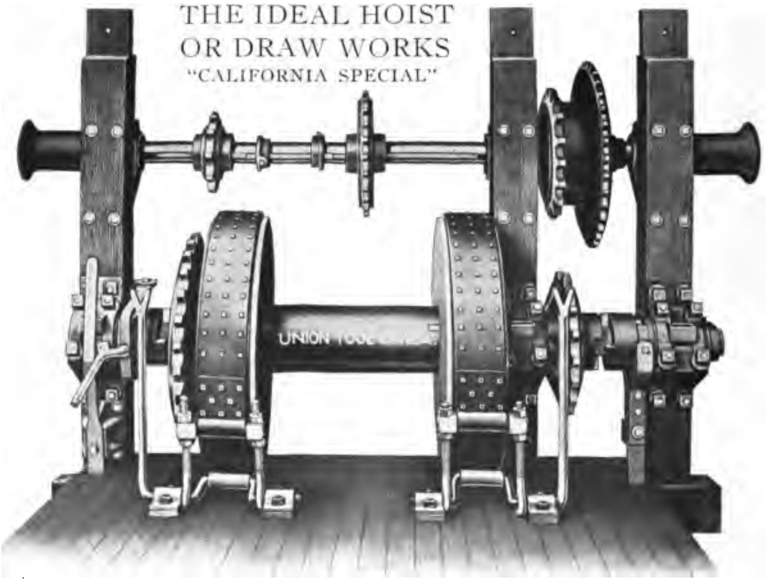


Fig. 189

Built strong and very compact, with levers so arranged that the operator has full control of the machine from one position.

DESCRIPTION	Weight in Pounds	Price
Complete with wood frame..........	8937	Upon application

Hydraulic Rotary Drilling Equipment

ROTARY MACHINE PARTS

Part Number	Number Required	NAME OF PART	Weight Each, Pounds
G-1209-C	1	Base	1188
G 1210-C	1	Gear table	1620
G-1212-B	4	Hold down bracket	32
10	8	Hold down bracket shim (¼" thick)	1
11	4	Hold down bracket shim (⅛" thick)	½
G-1356	2	Race ring	122
G 1211-C	20	Cone	14
G-1350	1	Clutch box	65
G-1351	1	Clutch box cap	32
G 1218	1	Clutch sprocket—16-tooth	85
G-1214	1	Clutch	40
G 1215-B	2	Shifter finger	1½
G-1348	1	Shifter yoke	20
G-1352	1	Plain box	57
G-1353	1	Plain box cap	26
G 1349	2	Shifter lever box	5
G 1213-B	1	Bevel pinion	100
1	1	Pinion shaft	77
2	2	Clutch key	1½
3	1	Pinion shaft clutch guard	1½
5	1	Bevel pinion key	1
7	1	Pinion shaft wrench	7
8	8	Box shim (¼" thick)	2
9	4	Box shim (⅛" thick)	1
12	1	Chain guard	35
13	1	Shifter lever	24
14	1	Back up post	76
15	1	Shifter yoke key	½
		BOLT LIST (Not illustrated)	
120	4	Rotary base to sill, 1¼"x11½"	6¼
120	2	Pinion shaft box, 1¼"x11½"	6¼
121	2	Rear sill to main sill, ⅞"x8"	2¼
122	4	Shifter lever box, ½"x8"	½
123	4	Pinion shaft clutch box, ⅞"x5½"	1¾
124	4	Pinion shaft clutch box cap, ⅞"x6½"	2
125	4	Pinion shaft box, ⅞"x9"	2½
124	4	Pinion shaft box cap, ⅞"x6½"	2
126	8	Hold down bracket, ⅞"x5"	1¾
		TIMBERS	
100-R	1	Timber frame main sill (not illustrated)	250
100-L	1	Timber frame main sill	250
101	1	Pinion shaft box cross sill	50
102	1	Rear cross sill	30
		Total weight of rotary machine	4824

GRIPPING DEVICE PARTS

Part Number	Number Required	NAME OF PART	Weight Each, Pounds
622-L.B.	2	Adjusting screw nut, L. H.	45
623-L.B.	2	Adjusting screw nut cap, L. H.	20
622-R.B.	2	Adjusting screw nut, R. H.	45
623-R.B.	2	Adjusting screw nut cap, R. H.	20
25-B	2	Adjusting screw post	33
24	12	Cap screw	1¼
30	4	Adjusting screw post block	1
31	4	Adjusting screw post block pin	½
G-625	2	Adjusting screw locknut	8½
22	2	Grip ring mandrel	125
G-1539	4	Aligning washer, 4$\frac{3}{16}$" wide	35
G-624	4	Aligning washer, 5$\frac{5}{16}$" wide	37½
G-1540	4	Aligning washer, 5⅝" wide	40
21	4	Grip ring	32
18-B	2	Adjusting screw	45
26	2	Adjusting screw wrench	16
500	2	Adjusting screw ratchet wrench (complete)	7
		Total weight of gripping device	1328

FOR ILLUSTRATION OF PARTS, SEE PAGE 82.
PRICES UPON APPLICATION.

Hydraulic Rotary Drilling Equipment

ROTARY MACHINE PARTS

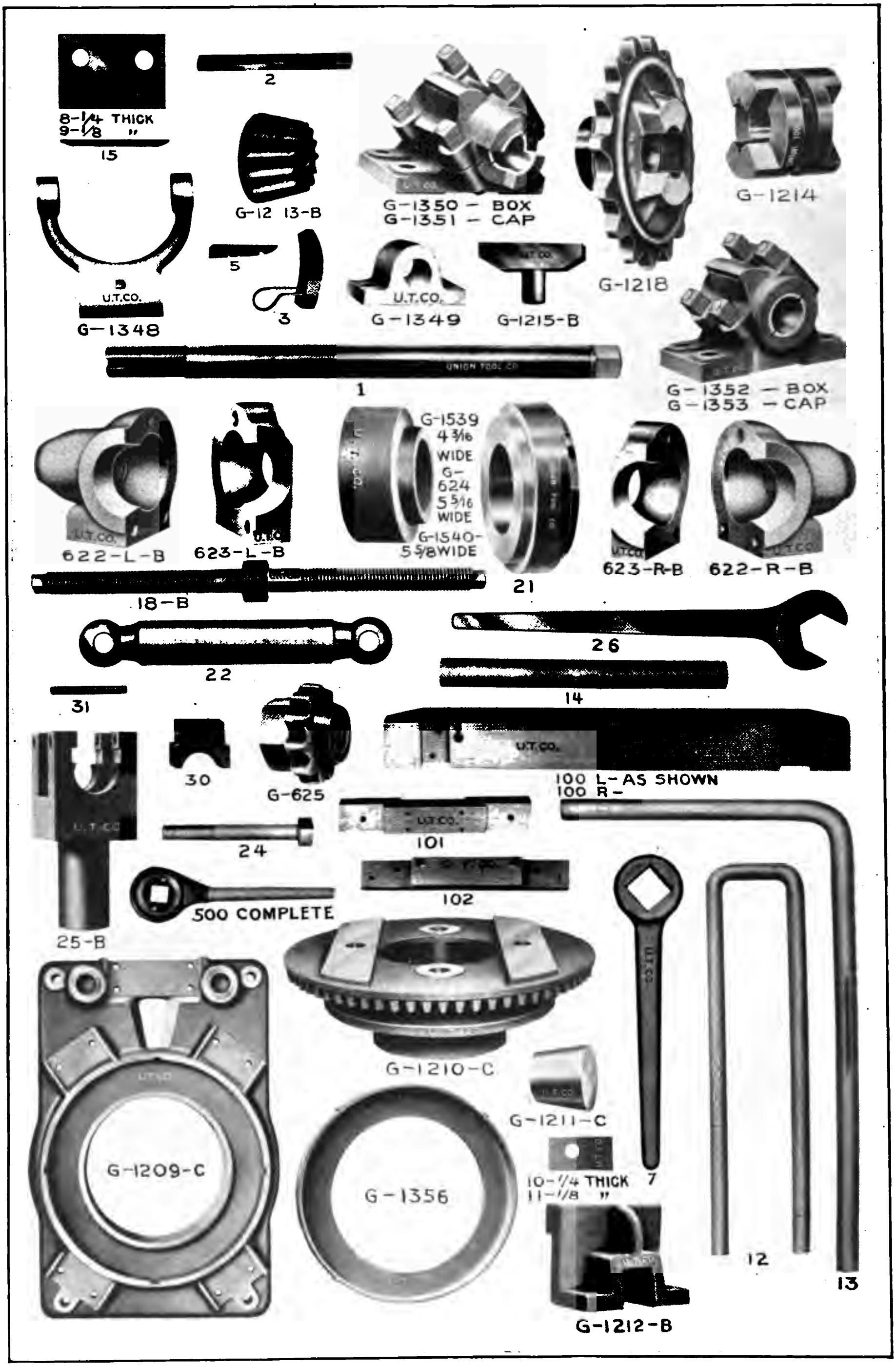


Fig. 190

Hydraulic Rotary Drilling Equipment

DRAW WORKS PARTS

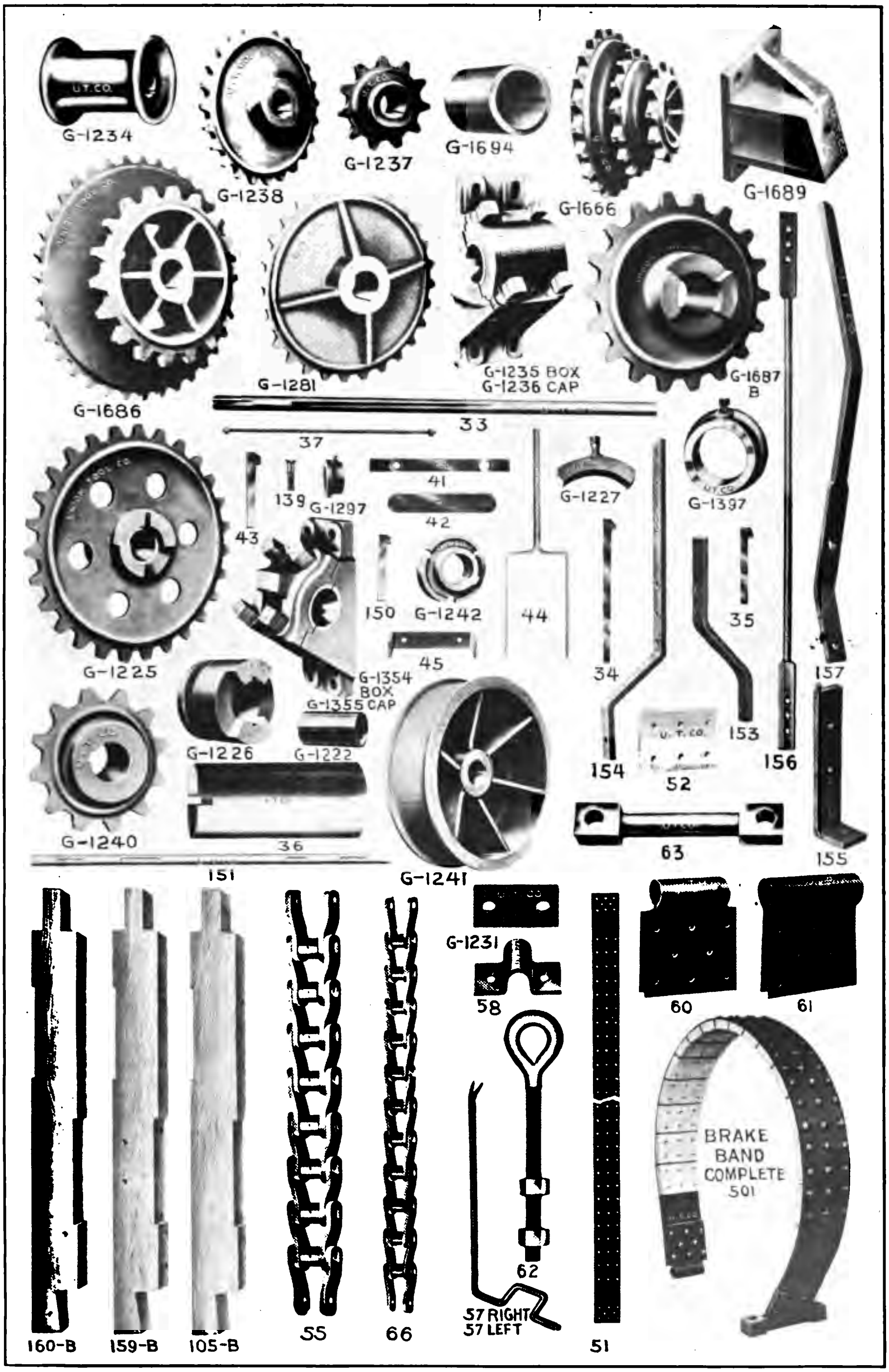


Fig. 191

Hydraulic Rotary Drilling Equipment

DRAW WORKS PARTS—DRUM

Part Number	Number Required	NAME OF PART	Weight Each, Pounds	Part Number	Number Required	NAME OF PART	Weight Each, Pounds
G-1354	3	Drum shaft box	172	43	1	Drum shaft flange key, gib key Q. H. end	2
G-1355	3	Drum shaft box cap	71				
G-1241	2	Brake drum flange	1040			BOLT AND SCREW LIST	
G-1225	1	Drum shaft Sprocket—27-tooth—1240-chain	570			(Not illustrated)	
G-1222	1	Drum shaft sprocket bushing	25	129	2	Drum shaft clutch lever bracket, ¾"x9½"	1½
G-1226	2	Drum shaft clutch	110	130	1	Drum shaft clutch lever, ¾"x15"	2
G-1227	4	Drum shaft clutch shifter finger	4½	132	12	Drum shaft box, 1¼"x14"	7¾
G-1242	1	Drum center support	40	132	6	Drum shaft box cap, long, 1¼"x14"	7¾
G-1297	2	Drum shaft collar	13	133	6	Drum shaft box cap, short, 1¼"x9"	5½
151	1	Drum shaft	615	142	1	Drum center support set screw, ¾"x1½"	¼
36	1	Drum	100	142	2	Drum shaft set collar set screw, ¾"x1½"	¼
44	1	Drum shaft clutch lever	35	138	2	Drum shaft clutch shifter finger cap screw, ¾"x1½"	¼
45	1	Drum shaft clutch lever bracket	10				
37	5	Drum tie rod	8	139	4	Drum shaft sliding clutch key screw, ½"x1½"	⅛
41	4	Drum shaft sliding clutch key	3				
42	1	Drum shaft flange key	3			Total weight of drum	4704

DRAW WORKS PARTS—LINE SHAFT

Part Number	Number Required	NAME OF PART	Weight Each, Pounds	Part Number	Number Required	NAME OF PART	Weight Each, Pounds
G-1235	3	Line shaft box	120	35	1	Line shaft drum drive sprocket key	2½
G-1236	3	Line shaft box cap	45	35	1	Line shaft engine drive sprocket key	2½
G-1686	1	Line shaft rotary and drum drive sprocket, 18 tooth—1240 chain, and 36 tooth—1030 chain	520	G-1397	3	Line shaft set collar	10
				33	1	Line shaft	640
150	1	Line shaft rotary and drum drive sprocket key	2½			BOLT AND SCREW LIST (Not illustrated)	
G-1238	1	Line shaft engine drive sprocket, 24 tooth—1030 chain	215	142	3	Line shaft set collar set screw, ¾"x1½"	¼
G-1234	2	Line shaft nigger head	145	131	12	Line shaft box to timbers, ⅞"x13"	3½
34	2	Line shaft nigger head key	3	123	12	Line shaft box cap, ⅞"x5½"	2
G-1237	1	Line shaft drum drive sprocket, 11 tooth—1240 chain	135			Total weight of line shaft	2405

DRAW WORKS PARTS—BRAKE BANDS (2)

Part Number	Number Required	NAME OF PART	Weight Each, Pounds	Part Number	Number Required	NAME OF PART	Weight Each, Pounds
501	..	Brake band complete	....	G-1231	4	Brake lever anchor plate	8
51	2	Brake band	77				
52	34	Brake block	1½			BOLT AND SCREW LIST	
60	2	Brake band lever clevis	10			(Not illustrated)	
61	2	Brake lever adjustable eye bolt clevis	10				
63	2	Brake lever and eye bolt stud	14	135	32	Brake band clevis, ½"x1½"	3/16
62	4	Brake lever adjustable eye bolt	9	136	204	Brake block stove bolts, 5/16"x1¼"	1/16
57-R	1	Brake lever, right (not illustrated)	50	137	8	Brake lever anchor plate, 1"x5"	2⅛
57-L	1	Brake lever, left	50				
58	4	Brake lever anchor strap	5			Total weight of brake bands	497

FOR ILLUSTRATION OF PARTS, SEE PAGE 83—PRICES UPON APPLICATION.

Hydraulic Rotary Drilling Equipment

DRAW WORKS PARTS—QUICK HOISTING ATTACHMENT

Part Number	Number Required	NAME OF PART	Weight Each, Pounds
G-1687-B	1	Q. H. drum shaft clutch sprocket, 18 tooth —1240 chain	294
G-1694	1	Q. H. drum shaft clutch sprocket bushing	19
G-1689	1	Q. H. clutch lever bracket	52
153	1	Q. H. clutch shifter, short	14
154	1	Q. H. clutch shifter, long	22
155	1	Q. H. clutch shifter bracket	21
156	1	Q. H. connecting rod	52
157	1	Q. H. shifter rod	25
		BOLT AND SCREW LIST (Not illustrated)	
161	2	Q. H. clutch shifter, ¾"x2½"	⅝

Part Number	Number Required	NAME OF PART	Weight Each, Pounds
162	1	Q. H. clutch shifter swivel cap screw, 1"x4"	1½
163	1	Q. H. clutch shifter connecting cap screw, 1"x3"	1¼
164	2	Q. H. clutch shifter bracket, ¾"x10"	1⅝
163	1	Q. H. shifter lever connecting cap, 1"x3"	1¼
165	1	Q. H. shifter lever swivel cap screw, 1"x3"	1¼
166	4	Q. H. shifter lever bracket, ¾"x12"	1¾
138	2	Q. H. shifter finger cap screws, ¾"x1¼"	¼
139	4	Q. H. sliding clutch key screws, ½"x1½"	⅛
127	3	Derrick girt bolts, 1"x10"	3
128	3	Derrick mud sill bolts	4
		Total weight of quick hoisting attachment	538

DRAW WORKS PARTS—FRAME TIMBERS, ENGINE SPROCKET AND CHAIN

Part Number	Number Required	NAME OF PART	Weight Each, Pounds
		TIMBERS	
105-B	1	Drum and line shaft box timber	236
159-B	1	Shifter lever box timber	236
160-B	1	Clutch shifter post	236
		Total weight of timbers	708
		ENGINE SPROCKET	
G-1240	1	Engine sprocket, 12 tooth—1030 chain	85
		CHAIN	
66	80 Ft.	No. 1030 steel chain (engine drive)	496
55	29 Ft.	No. 1240 steel chain (drum drive) (W'ght. of chain not included in total w'ghts.)	464

SUMMARY	Weight, Pounds
SUMMARY OF DRAW WORKS PARTS	
Drum complete	4704
Line shaft complete	2405
Two brake bands complete	497
Quick hoisting attachment	538
Timbers	708
Engine sprocket	85
Total weight of draw works	8937

DRAW WORKS SPECIAL PARTS

SPROCKETS

Part Number	Number Required	NAME OF PART	Weight Each, Pounds
G-1281	1	Line shaft engine drive sprocket—28 tooth, No. 1030 chain	285
G-1239	1	Line shaft rotary drive sprocket—36 tooth, No. 1030 chain (not illustrated)	350

THREE STEP SPROCKETS

Part Number	Number Required	NAME OF PART	Weight Each, Pounds
G-1666	1	Engine sprocket—12-16-22 tooth, No. 1030 chain	235
G-1667	1	Line shaft engine drive sprocket—14-20-24 tooth, No. 1030 chain (not illustrated)	275

FOR ILLUSTRATION OF PARTS, SEE PAGE 83—PRICES UPON APPLICATION.

Hydraulic Rotary Drilling Equipment

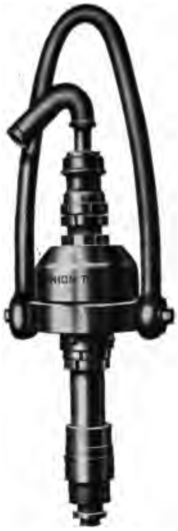


Fig. 192

THE IDEAL HYDRAULIC SWIVEL

"CALIFORNIA SPECIAL"

Equipped with anti-friction double ball bearings to facilitate the handling of long and heavy strings of pipe.

Independent upper and lower sets of balls used on the wash pipe making a universal bearing taking care of the water pressure.

Size, Inches	Size Water Connection, Inches	Size Pipe Connection, Inches	Weight Complete, Pounds
5	2½	6	1238
4	2½	6	800

PRICES UPON APPLICATION.

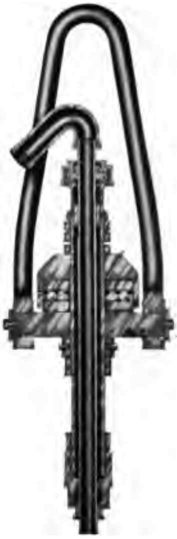


Fig. 193

PARTS

Part Number		Number Required	NAME OF PART	Weight Each in Pounds	
5-inch	4-inch			5-inch	4-inch
64	264	1	Sleeve pipe	103	70
76	276	1	Bail	268	145
G-1248	G-1590	1	Bearing plate	180	88
70	270	1	Cross head lock nut	240	138
71	271	2	Cross head cap	2	1½
67	275	2	Cross head cap-cap screw, ⅞"x1½"	⅛	⅛
G-1247	G-1589-R	1	Cross head bushing	10	7
G-1340-R	G-1589-R	2	Cross head lock nut	7	5½
G-1340-L	G-1589-L	2	Stuffing box and bearing plate lock nut	7	5½
G-1339	G-1591	1	Set collar	24	16
66	266	4	Set collar set screws	⅛	⅛
G-1388	G-1592	1	Ball bearing guide plate	26	17
90	290	2	Ball bearing race plate	63	38½
91	291	24	Ball bearing race plate ball	½	⅓
G-1243	G-1243	1	Gooseneck	26	26
G-1244-C	G-1588	1	Stuffing box cap	18	18
G-1245-C	G-1587	1	Stuffing box	36	36
82-B	82-B	2	Upper and lower ball race	3	3
84	84	1	Ball race spacing ring	2	2
80-B	80-B	1	Center ball race	2	2
83-B	83-B	1	Ball race lock nut	1	1
68-B	68-B	58	Sleeve pipe ball (½")	⅓ ounce	⅓ ounce
65	265	1	Sleeve pipe stuffing box bushing	7	5
69	269	1	Drill pipe bushing lock collar	19	15
74	274	1	Drill pipe bushing (6")	53	50
G-1246	G-1246	1	Lower stuffing gland	6	6
75	75	1	Wash pipe	33	33
78	278	1	Large spanner wrench	4	4
79	79	1	Small spanner wrench	2	2
			Total weight of swivel	1238	800
			SPECIAL PARTS		
77	277	2	Cone race	63	40
85	285	16	Cone	2	1½
73	73	1	Drill pipe bushing—6" to 4"	50	50
72	72	..	Drill pipe bushing—4" to 6"	60	60

FOR ILLUSTRATION OF PARTS, SEE PAGE 87.

PRICES UPON APPLICATION.

Hydraulic Rotary Drilling Equipment

SWIVEL PARTS

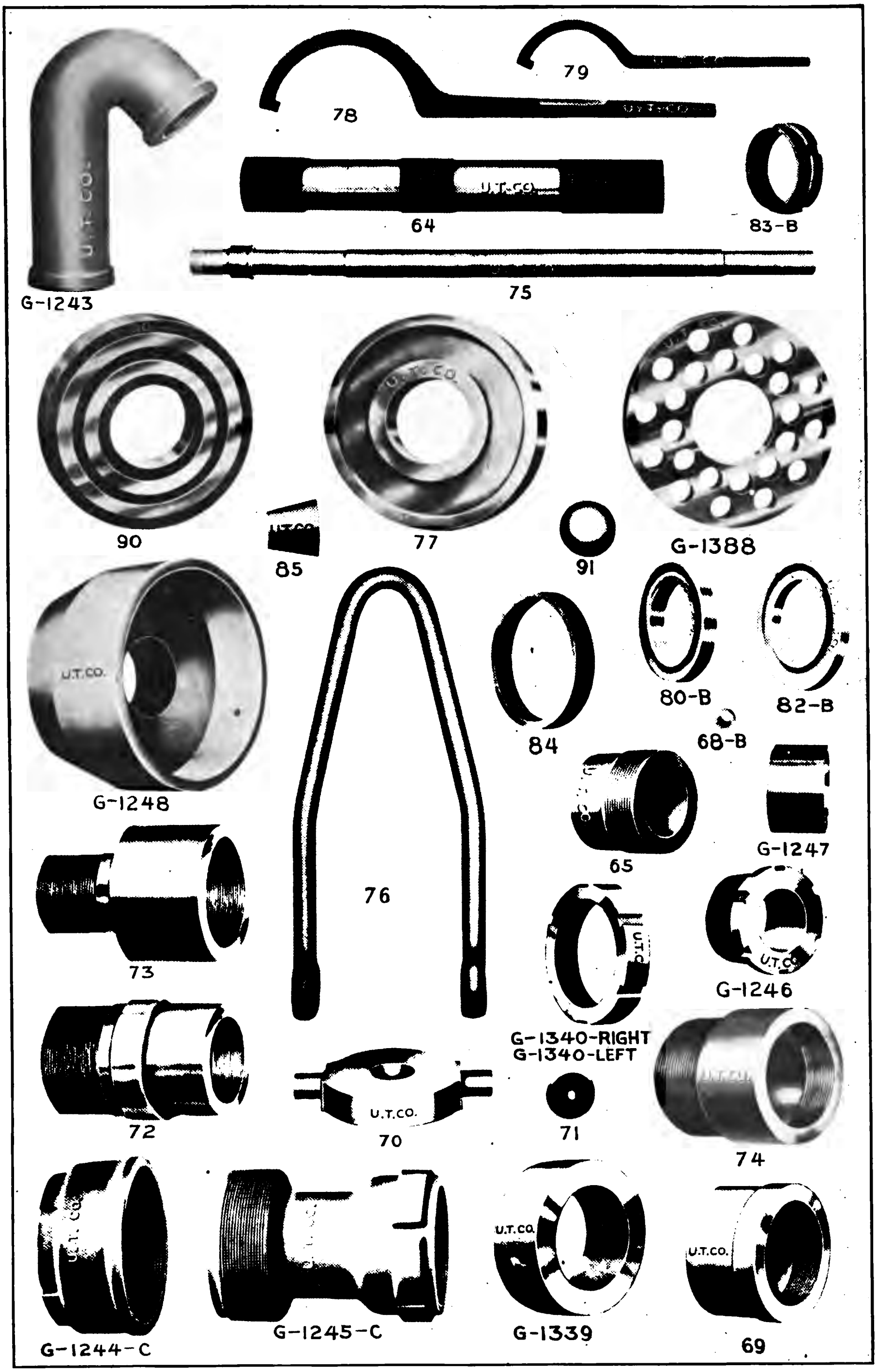


Fig. 194

Hydraulic Rotary Drilling Equipment

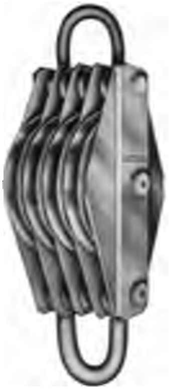


Fig. 195

FOUR SHEAVE ROTARY BLOCKS

BRONZE BUSHED

Size in Inches	Size Sheave, Inches	Weight in Pounds	Price Each
41	24x3¼	1600	$180.00

STRAPPED "C" HOOKS

Size, Inches	Inside Diameter, Inches	Weight, Pounds	Price, Each
1¼	7x2	12	$ 3.00
1½	8x2¼	14	3.50
1¾	9x2½	18	4.50
2	11x3	30	7.00
2¼	12x3¼	40	7.25
2½	13x3¾	50	7.50
2¾	14x4	65	10.00
3	15x4½	85	12.50
3¼	16x4¾	95	15.25
3½	18x5	125	21.00
3¾	19x5¼	145	25.00
4	20x5½	175	30.00

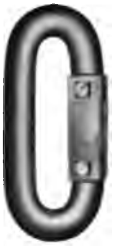


Fig. 196

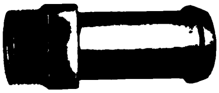
ROTARY HOSE

ROUND WIRE WOUND

Fig. 197

Each outfit requires two 30-foot lengths with couplings.

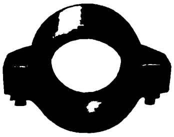
Size, Inches	4-ply, Per Foot	5-ply, Per Foot	6-ply, Per Foot	8-ply, Per Foot
2	$1.66	$2.07	$2.49	$3.32
2½	2.08	2.60	3.12	4.16



COUPLING
Fig. 198

ROTARY HOSE COUPLINGS

BRASS



CLAMP
Fig. 199

Size ....inches	2	2½
Weight (one coupling and one clamp)........pounds	6½	8¼
Brass, per set of four pieces........	$8.00	$10.00
Brass coupling only ....each	2.00	2.50
Brass clamp only .... "	2.00	2.50

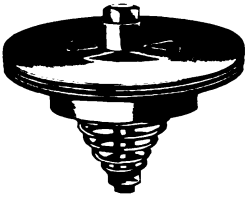


Fig. 200

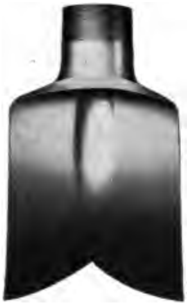
BACK PRESSURE VALVES

CAST IRON AND STEEL

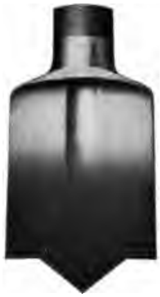
Size ....inches	4	4½	6	8	10	12
Weight ......pounds	2	2¾	3½	6	9½	....
Cast iron.........each	$1.80	$1.80	$2.50	$3.00	$3.50	$ 4.50
Steel .... "	3.50	3.50	5.00	6.50	8.50	10.00

Hydraulic Rotary Drilling Equipment

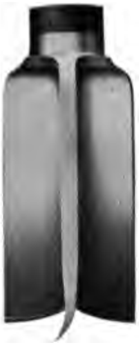
ROTARY BITS



FISH TAIL BIT
Fig. 201



DIAMOND POINT BIT
Fig. 202



FOUR WING BIT
Fig. 203

FISH TAIL BITS

Size ....inches	6	8	10	12½	15½	18	20
Size shank ....inches	4	4	6	6	6	6	6
Length of blade..............inches	15	15	15	15	15	15	15
Weight ....pounds	55	75	140	150	175	200	220
Price ....each	$12.00	$16.00	$20.00	$31.25	$38.75	$45.00	$50.00

DIAMOND POINT BITS

Size ....inches	6	8	10	12½	15½	18	20
Size shank ....inches	4	4	6	6	6	6	6
Length of blade..............inches	15	15	15	15	15	15	15
Weight ....pounds	55	75	140	150	175	200	220
Price ....each	$12.00	$16.00	$20.00	$31.25	$38.75	$45.00	$50.00

FOUR WING BITS

Size ....inches	6	8	10	12½	15½	18	20
Size shank ....inches	4	4	6	6	6	6	6
Length of blade..............inches	24	24	24	24	24	24	24
Weight ....pounds	60	130	185	295	350	400	460
Price ....each	$42.00	$56.00	$80.00	$100.00	$124.00	$144.00	$160.00

ROTARY SHOES

FORGED STEEL

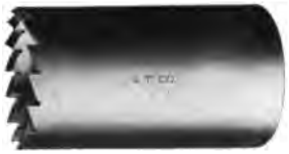


Fig. 204

Size ....inches	4	4	4	4½	4½	4½	6¼
Length ....inches	12	14	16	12	14	16	12
Weight ....pounds	30	35	40	34	40	45	47
Price ....each	$22.00	$26.00	$29.00	$25.00	$29.00	$33.00	$26.00
Size ....inches	6¼	6¼	8¼	8¼	8¼	10	10
Length ....inches	14	16	12	14	16	12	14
Weight ....pounds	55	65	60	70	80	80	95
Price ....each	$30.00	$35.00	$30.00	$34.00	$39.00	$36.00	$45.00
Size ....inches	10	12½	12½	12½	13½	13½	15½
Length ....inches	16	12	14	16	14	16	16
Weight ....pounds	110	100	115	130	130	150	180
Price ....each	$50.00	$42.00	$48.00	$56.00	$55.00	$64.00	$80.00

Hydraulic Rotary Drilling Equipment

DRILL BUSHINGS

FORGED STEEL

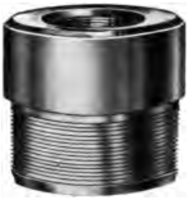


Fig. 205

Size ....inches	4x2½	4x6	6x4	8¼x4	8¼x6
Weight ....pounds Price ....each	38 $9.00	63 $17.50	75 $17.50	113 $25.00	103 $25.00
Size ....inches	10x4	10x6	12½x6	15½x6	....
Weight ....pounds Price ....each	170 $38.50	152 $38.50	224 $51.00	340 $76.50	....

DRILL COLLARS

FORGED STEEL

Size, Inches	Length, Inches	Weight, Pounds	Price, Each
2½x2½	12	20	$10.00
4x4	16	60	25.00
5x5	18	125	35.00
6x4	18	150	40.00
6x6	18	135	40.00

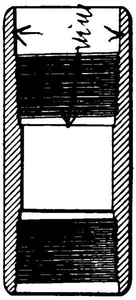


Fig. 206

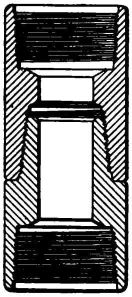


Fig. 207
(Patented)

ROTARY TOOL JOINTS

FORGED STEEL

A taper joint which is inserted in the drill pipe wherever it is frequently separated when being pulled.

Size, Inches	Size Box and Pin, Inches	Threads Per Inch	Length, Inches	Weight, Pounds	Price, Each
4	3½x4½	7	18	80	$22.00
5	4 x5	7	18	128	28.00
6	5 x6	7	18	135	28.00

SLIDE TONGS

FORGED STEEL

Placed under elevators when resting upon rotary table.

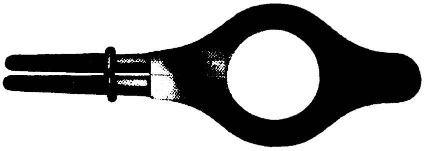


Fig. 208

For size pipe ....inches	4	6	8¼	10	12½
Weight ....pounds	100	125	200	230	275
Heavy pattern ....each	$22.00	$28.00	$32.50	$37.50	$47.50
Weight ....pounds	135	150	260	......	......
Extra heavy pattern ....each	$45.00	$55.00	$75.00	......	......

Hydraulic Rotary Drilling Equipment

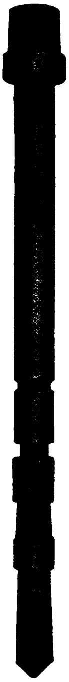


Fig. 209

WASHDOWN ROTARY SPEARS

Size .... inches	2½	4	5	6
Weight .... pounds	30	100	150	240
Price .... each	$50.00	$80.00	$95.00	$105.00

PARTS

Size .... inches	2½	4	5	6
Mandrel .... each	$14.50	$19.00	$20.00	$22.00
Upper collar.......... "	6.50	11.00	13.00	15.00
Lower collar.......... "	6.00	8.00	9.00	11.00
Bit .... "	15.00	20.00	21.00	22.00
Slips .... per set	7.50	10.00	11.00	12.00
Key .... each	1.50	2.00	2.00	2.00
Stem .... "	4.00	20.00	24.00	31.00

OVERSHOTS

Used in fishing for a string of pipe lost in the hole or broken off at the couplings.

Lowered and rotated on drill pipe over the article desired to catch.

For Size Drill Pipe, Inches	For Size Hole, Inches	Weight, Pounds	Price, Each
4	8¼	275	$ 90.00
6	12½	300	130.00

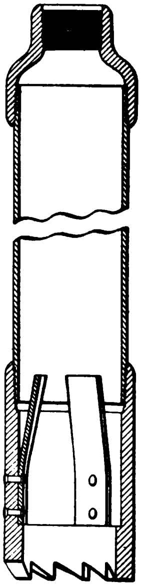


Fig. 210

Barnes Heaving Plugs

Floating Plugs

Neely Spudding Shoes

Casing and Drive Pipe Shoes

Casing Adapters

Drop Drive Heads

Drive Clamps

Casing Clamps

Elevators

Spiders and Slips

Snatch Blocks

Tubing and Casing Hooks

Pages 92 to 106 Inclusive

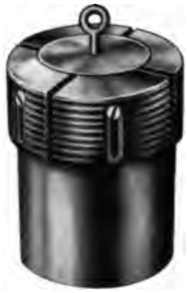


Fig. 211

Barnes Heaving Plugs

The only heaving plug on the market that will shut off sand successfully. No wood plugs needed with this plug.

Size, Inches	Weight, Pounds	Price, Each	Size, Inches	Weight, Pounds	Price, Each
4½	14	$4.50	8¼	43	$ 8.00
5⅝	19	5.50	9⅝	55	9.50
6	27	6.00	10	64	10.00
6¼	27	6.00	11⅝	70	11.50
6⅝	27	6.50	12½	92	12.50
7⅝	43	7.50	13½	120	13.50
8	43	8.00	15½	136	15.50

Floating Plugs

To screw in bottom of casing shoe to float casing into well. Also used as starter to prevent shoe catching in casing.

Size, Inches	Weight, Pounds	Price, Each	Size, Inches	Weight, Pounds	Price, Each
4½	18	$5.00	8	55	$12.50
5⅝	30	6.00	8¼	55	12.50
6	25	6.50	9⅝	65	17.00
6¼	25	6.50	10	70	18.00
6⅝	26	7.00	11⅝	90	21.00
7⅝	45	9.00	12½	112	24.00

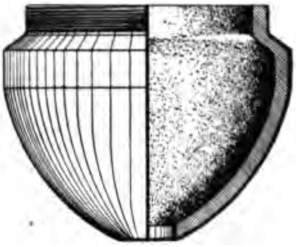


Fig. 212

Neely Spudding Shoes

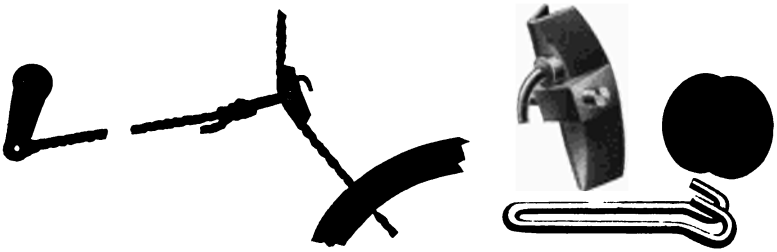


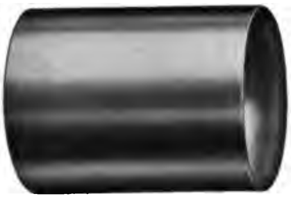
Fig. 213

Shoe complete, weight 45 lbs	$10.00
Shoe only, weight 17 lbs	7.00
Clevice only, weight 13 lbs	$1.50
Spool only, weight 15 lbs	2.00

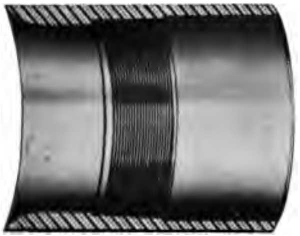
This appliance is used to connect the jerk line to the cable. To remove the line it is only necessary to detach the clevice from the shoe.

Casing and Drive Pipe Shoes

TO SCREW



EXTERIOR VIEW
Fig. 214



SECTIONAL VIEW
Fig. 215

Size, Inches	Length, Inches	Thickness, Inches	Weight, Pounds	Price, Each
4½	6	¾	12	$ 6.00
4½	8	¾	16	8.00
4½	8	⅞	20	9.25
4½	10	¾	20	10.00
4½	10	⅞	22	11.75
4½	10	1	25	13.25
4½	12	¾	24	12.00
4½	12	⅞	30	14.00
4½	12	1	34	16.00
4½	12	1¼	34	20.00
4½	14	1	40	18.75
4½	14	1¼	40	23.50
4½	16	1	45	21.50
4½	16	1¼	45	26.50
5	6	¾	14	6.75
5	8	¾	19	9.00
5	8	⅞	22	10.50
5	10	¾	23	11.25
5	10	⅞	26	13.00
5	10	1	30	15.00
5	12	¾	28	13.50
5	12	⅞	32	15.75
5	12	1	36	18.00
5	12	1¼	36	22.50
5	14	1	42	21.00
5	14	1¼	42	26.50
5	16	1	48	24.00
5	16	1¼	48	30.00
5⅝	6	¾	16	7.50
5⅝	8	¾	21	10.00
5⅝	8	⅞	24	11.75
5⅝	10	¾	27	12.50
5⅝	10	⅞	30	14.50
5⅝	10	1	35	16.75
5⅝	12	¾	32	15.00
5⅝	12	⅞	36	17.50
5⅝	12	1	42	20.00
5⅝	12	1¼	42	25.00
5⅝	14	1	49	23.50
5⅝	14	1¼	49	29.00
5⅝	16	1	56	26.50
5⅝	16	1¼	56	33.50
6-6¼	6	¾	18	8.00
6-6¼	8	¾	24	10.75
6-6¼	8	⅞	27	12.50
6-6¼	10	¾	30	13.25
6-6¼	10	⅞	33	15.50
6-6¼	10	1	39	17.75
6-6¼	12	¾	35	16.00
6-6¼	12	⅞	40	$18.75
6-6¼	12	1	47	21.50
6-6¼	12	1¼	47	26.50
6-6¼	14	1	55	25.00
6-6¼	14	1¼	55	31.00
6-6¼	16	1	63	28.50
6-6¼	16	1¼	63	35.50
6⅝	6	¾	18	8.75
6⅝	8	¾	24	11.75
6⅝	8	⅞	28	13.75
6⅝	10	¾	31	14.75
6⅝	10	⅞	35	17.00
6⅝	10	1	42	19.50
6⅝	12	¾	37	17.50
6⅝	12	⅞	43	20.50
6⅝	12	1	50	23.50
6⅝	12	1¼	50	29.50
6⅝	14	1	58	27.50
6⅝	14	1¼	58	34.00
6⅝	16	1	66	31.50
6⅝	16	1¼	66	39.00
7	6	¾	20	9.25
7	8	¾	26	12.25
7	8	⅞	30	14.50
7	10	¾	33	15.50
7	10	⅞	38	18.00
7	10	1	43	20.50
7	12	¾	39	18.50
7	12	⅞	45	21.50
7	12	1	52	24.50
7	12	1¼	52	31.00
7	14	1	60	29.00
7	14	1¼	60	36.00
7	16	1	70	33.00
7	16	1¼	70	41.00
7⅝	6	¾	21	10.00
7⅝	8	¾	28	13.50
7⅝	8	⅞	32	15.75
7⅝	10	¾	35	16.75
7⅝	10	⅞	40	19.50
7⅝	10	1	45	22.50
7⅝	12	¾	42	20.00
7⅝	12	⅞	48	23.50
7⅝	12	1	56	27.00
7⅝	12	1¼	56	33.50
7⅝	14	1	65	31.50
7⅝	14	1¼	65	39.50
7⅝	16	1	75	36.00
7⅝	16	1¼	75	45.00

When ordering, state size and weight of casing, number of threads to the inch, also diameter of hole in which they are to be used.

Casing and Drive Pipe Shoes

TO SCREW

Size, Inches	Length, Inches	Thickness, Inches	Weight, Pounds	Price, Each	Size, Inches	Length, Inches	Thickness, Inches	Weight, Pounds	Price, Each
8-8¼	6	¾	23	$10.75	10	12	⅞	62	$31.00
8-8¼	8	¾	30	14.25	10	12	1	75	35.50
8-8¼	8	⅞	36	16.50	10	12	1¼	75	44.50
8-8¼	10	¾	38	17.75	10	14	1	88	41.50
8-8¼	10	⅞	45	21.00	10	14	1¼	88	52.00
8-8¼	10	1	50	23.50	10	16	1	100	47.50
8-8¼	12	¾	45	21.50	10	16	1¼	100	59.50
8-8¼	12	⅞	55	25.00	11⅝	6	¾	32	15.50
8-8¼	12	1	60	28.50	11⅝	8	¾	42	20.50
8-8¼	12	1¼	60	35.50	11⅝	8	⅞	56	24.00
8-8¼	14	1	70	33.00	11⅝	10	¾	58	26.00
8-8¼	14	1¼	70	41.50	11⅝	10	⅞	70	30.00
8-8¼	16	1	80	38.00	11⅝	10	1	73	34.50
8-8¼	16	1¼	80	47.50	11⅝	12	¾	65	31.00
9	6	¾	25	12.00	11⅝	12	⅞	73	36.00
9	8	¾	32	16.00	11⅝	12	1	88	41.50
9	8	⅞	38	18.75	11⅝	12	1¼	88	51.50
9	10	¾	40	20.00	11⅝	14	1	103	48.50
9	10	⅞	48	23.50	11⅝	14	1¼	103	60.50
9	10	1	55	26.50	11⅝	16	1	118	55.00
9	12	¾	50	24.00	11⅝	16	1¼	118	69.00
9	12	⅞	58	28.00	12½	6	¾	37	16.75
9	12	1	66	32.00	12½	8	¾	50	22.00
9	12	1¼	66	40.00	12½	8	⅞	60	26.00
9	14	1	76	37.50	12½	10	¾	62	28.00
9	14	1¼	76	46.50	12½	10	⅞	74	32.50
9	16	1	87	42.50	12½	10	1	80	37.00
9	16	1¼	87	53.50	12½	12	¾	75	33.50
9⅝	6	¾	26	12.75	12½	12	⅞	82	39.00
9⅝	8	¾	34	17.00	12½	12	1	96	44.50
9⅝	8	⅞	40	20.00	12½	12	1¼	96	55.50
9⅝	10	¾	43	21.50	12½	14	1	112	52.00
9⅝	10	⅞	52	25.00	12½	14	1¼	112	65.00
9⅝	10	1	60	28.50	12½	16	1	128	59.50
9⅝	12	¾	52	25.50	12½	16	1¼	128	74.00
9⅝	12	⅞	60	30.00	13½	6	¾	42	18.00
9⅝	12	1	70	34.00	13½	8	¾	56	24.00
9⅝	12	1¼	70	42.50	13½	8	⅞	65	28.00
9⅝	14	1	80	40.00	13½	10	¾	70	30.00
9⅝	14	1¼	80	50.00	13½	10	⅞	80	35.00
9⅝	16	1	90	45.50	13½	10	1	84	40.00
9⅝	16	1¼	90	57.00	13½	12	¾	85	36.00
10	6	¾	28	13.25	13½	12	⅞	90	42.00
10	8	¾	37	17.75	13½	12	1	105	48.00
10	8	⅞	44	21.00	13½	12	1¼	105	60.00
10	10	¾	46	22.00	13½	14	1	120	56.00
10	10	⅞	55	26.00	13½	14	1¼	120	70.00
10	10	1	63	29.50	13½	16	1	145	64.00
10	12	¾	56	26.50	13½	16	1¼	145	80.00

When ordering, state size and weight of casing, number of threads to the inch, also diameter of hole in which they are to be used.

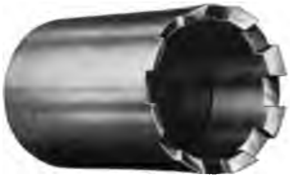


Fig. 216

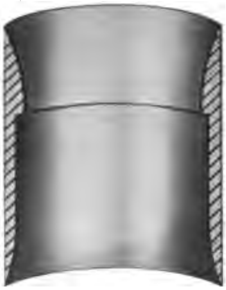
Baker Casing and Drive Pipe Shoes

(Patented)

TO SCREW

Size, Inches	Length, Inches	Thickness, Inches	Weight, Pounds	Price, Each	Size, Inches	Length, Inches	Thickness, Inches	Weight, Pounds	Price, Each
4½	12	⅞	20	$17.00	8¼	14	1	48	$47.50
4½	12	1	24	18.00	8¼	16	1	55	50.00
4½	14	⅞	22	18.50	9⅝	12	1	65	47.50
4½	14	1	26	19.50	9⅝	14	1	75	52.50
4½	16	⅞	24	20.00	9⅝	16	1	85	55.00
4½	16	1	28	21.00	10	12	1⅛	68	50.00
5⅝	12	1	26	21.00	10	14	1⅛	75	55.00
5⅝	14	1	29	22.50	10	16	1⅛	80	57.50
5⅝	16	1	32	25.00	11⅝	14	1⅛	85	56.00
6¼	12	1	28	28.50	11⅝	14	1¼	90	57.50
6¼	14	1	31	30.00	11⅝	16	1⅛	95	59.50
6¼	16	1	35	32.50	11⅝	16	1¼	103	62.50
6⅝	12	⅞	30	30.00	12½	14	1¼	105	60.00
6⅝	14	⅞	35	32.50	12½	16	1¼	123	65.00
6⅝	16	⅞	40	35.00	13½	16	1¼	135	70.00
7⅝	12	1	36	37.50	15½	16	1¼	155	75.00
7⅝	14	1	42	42.50	16	16	1¼	160	82.50
7⅝	16	1	48	45.00	18	16	1¼	185	90.00
8¼	12	1	42	42.50					

When ordering, state size and weight of casing, number of threads to the inch, also diameter of hole in which they are to be used.



SECTIONAL VIEW
Fig. 217

Casing Adapters

To adapt one size casing to another and allow tools to be lowered in the well.

Inside Diameter of Casing, Inches	Wt., Lbs.	Price, Each	Inside Diameter of Casing, Inches	Wt., Lbs.	Price, Each
4½ to 6¼	25	$12.00	7 to 9	37	$14.50
4½ to 6⅝	27	12.00	7⅝ to 9⅝	45	15.50
5 to 7	30	13.00	8¼ to 10	53	15.75
5⅝ to 7⅝	32	13.50	9 to 11	62	17.50
6¼ to 8¼	35	14.00	9⅝ to 11⅝	70	18.00
6⅝ to 8¼	30	14.00	10 to 12½	80	19.50

Drop Drive Heads

CAST IRON—FOR SCREW CASING

Size, Inches	Weight, Pounds	Price, Each	Size, Inches	Weight, Pounds	Price, Each
6¼	50	$ 9.00	11⅝	245	$21.50
6⅝	60	9.50	12½	275	25.50
7⅝	85	10.00	13½	420	42.00
8¼	100	10.50	14½	485	48.50
9⅝	125	12.50	15½	530	53.00
10	150	14.50			

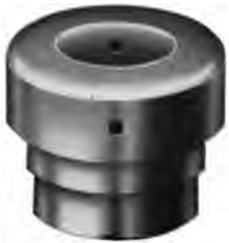


Fig. 218

FORGED STEEL—FOR SCREW CASING

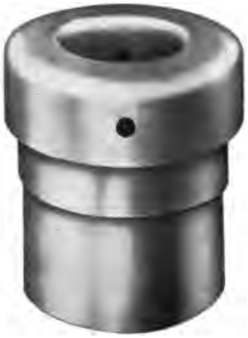


Fig. 219

Size, Inches	Weight, Pounds	Price, Each	Size, Inches	Weight, Pounds	Price, Each
6¼	60	$30.00	11⅝	325	$58.50
6⅝	65	30.00	12½	380	65.00
7⅝	90	36.00	13½	450	72.00
8¼	100	36.00	14½	540	87.50
9⅝	180	45.00	15½	650	108.00
10	230	47.00			

CAST IRON—FOR STOVE PIPE CASING

Size, Inches	Weight, Pounds	Price, Each	Size, Inches	Weight, Pounds	Price, Each
13	390	$39.00	17	675	$67.50
13½	420	42.00	17½	710	71.00
14	450	45.00	18	750	75.00
14½	485	48.50	18½	800	80.00
15	490	49.00	19	850	85.00
15½	530	53.00	19½	900	90.00
16	580	58.00	20	950	95.00
16½	650	65.00			

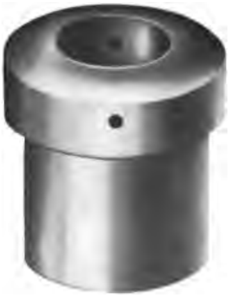


Fig. 220

Drive Clamps

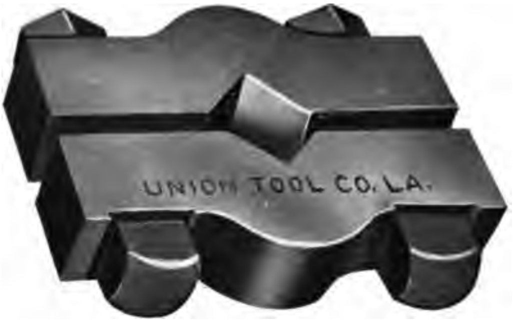


Fig. 221

Size Square on Stem, Inches	Size of Bolts, Inches	Size Material, Inches	Wt., Lbs.	Price, Each	Size Square on Stem, Inches	Size of Bolts, Inches	Size Material, Inches	Wt., Lbs.	Price, Each
2¾	2 x10	3½x3½x12	110	$17.50	4¼	2½x16	6x6x18	420	$67.50
3¼	2 x12	4 x4 x14	155	25.00	4¼	2¾x14	5x5x18	320	51.50
3¼	2 x13	4½x4½x14	190	30.00	4¼	2¾x16	5x6x18	375	60.00
4¼	2 x13	4½x4½x16	215	34.50	4¼	2¾x16	6x6x18	435	69.50
4¼	2½x13	4½x4½x16	235	37.50	4¼	3 x16	6x6x20	490	78.50
4¼	2½x14	5 x5 x18	310	49.50	5	3 x16	6x6x20	490	78.50

DRIVE CLAMP BOLTS WITH NUTS

Size, Inches	Weight, Pounds	Price, Each	Size, Inches	Weight, Pounds	Price, Each	Size, Inches	Weight, Pounds	Price, Each
2 x10	20	$3.00	2½x13	38½	$5.75	2¾x16	54	$8.00
2 x11	21	3.25	2½x14	40	6.00	2¾x17	56	8.25
2 x12	22	3.50	2½x15	41½	6.25	2¾x18	58	8.50
2 x13	23	3.75	2½x16	43	6.50	3 x14	60	9.00
2 x14	24	4.00	2½x17	44½	6.75	3 x15	62	9.25
2 x15	25	4.25	2½x18	46	7.00	3 x16	64	9.50
2 x16	26	4.50	2¾x14	50	7.50	3 x17	66	9.75
2½x12	37	5.50	2¾x15	52	7.75	3 x18	68	10.00

DRIVE CLAMP WRENCHES

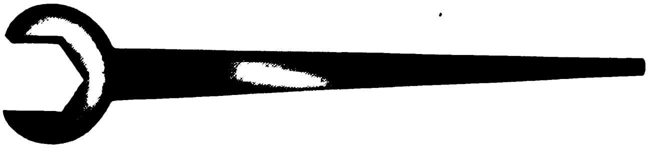


Fig. 222

Size opening ....inches	3	3⅞	4¼	4⅝
For size bolt ....inches	2	2½	2¾	3
Weight each ....pounds	25	40	50	60
Price ....each	$4.00	$6.50	$8.00	$9.50

Casing Clamps

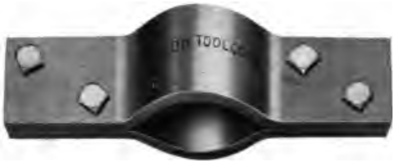


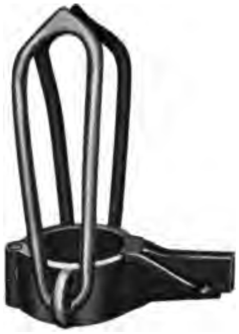
Fig. 223

For Size Casing, Inches	Size Material, Inches	Length of Ears, Inches	No. Bolts Each End	Wt., Lbs.	Price, Each	For Size Casing, Inches	Size Material, Inches	Length of Ears, Inches	No. Bolts Each End	Wt., Lbs.	Price, Each
4½	1 x 4	8	2	55	$5.50	4½	1 x 4	10	2	65	$6.50
4½	1 x 6	8	2	82	8.25	4½	1 x 6	10	2	96	9.50
4½	1 x 8	8	3	110	11.00	4½	1 x 8	10	3	128	12.75
5	1 x 4	8	2	56	5.50	5	1 x 4	10	2	66	6.50
5	1 x 6	8	2	84	8.50	5	1 x 6	10	2	98	9.75
5	1 x 8	8	3	112	11.25	5	1 x 8	10	3	130	13.00
5⅝	1 x 4	8	2	58	5.75	5⅝	1 x 4	10	2	68	6.75
5⅝	1 x 6	8	2	87	8.75	5⅝	1 x 6	10	2	100	10.00
5⅝	1 x 8	8	3	116	11.50	5⅝	1 x 8	10	3	134	13.50
6¼	1 x 4	8	2	60	6.00	6¼	1 x 4	10	2	70	7.00
6¼	1 x 6	8	2	90	9.00	6¼	1 x 6	10	2	104	10.50
6¼	1 x 8	8	3	120	12.00	6¼	1 x 8	10	3	138	13.75
6⅝	1 x 4	8	2	62	6.25	6⅝	1 x 4	10	2	72	7.25
6⅝	1 x 6	8	2	93	9.50	6⅝	1 x 6	10	2	107	10.75
6⅝	1 x 8	8	3	124	12.50	6⅝	1 x 8	10	3	142	14.25
7⅝	1 x 4	8	2	66	6.50	7⅝	1 x 4	10	2	76	7.50
7⅝	1 x 6	8	3	99	10.00	7⅝	1 x 6	10	3	113	11.25
7⅝	1 x 8	8	3	132	13.25	7⅝	1 x 8	10	3	150	15.00
8¼	1 x 4	8	2	67	6.75	8¼	1 x 4	10	2	77	7.75
8¼	1 x 6	8	3	100	10.00	8¼	1 x 6	10	3	114	11.50
8¼	1 x 8	8	3	134	13.50	8¼	1 x 8	10	3	152	15.25
8¼	1 x10	8	3	167	16.75	8¼	1 x10	10	3	197	19.75
9⅝	1 x 4	8	2	72	7.25	9⅝	1 x 4	10	2	82	8.25
9⅝	1 x 6	8	3	108	10.75	9⅝	1 x 6	10	3	122	12.25
9⅝	1 x 8	8	3	144	14.50	9⅝	1 x 8	10	3	162	16.25
9⅝	1 x10	8	3	180	18.00	9⅝	1 x10	10	3	210	21.00
10	1 x 4	8	2	74	7.50	10	1 x 4	10	2	84	8.50
10	1 x 6	8	3	110	11.00	10	1 x 6	10	3	125	12.50
10	1 x 8	8	3	148	14.75	10	1 x 8	10	3	166	16.50
10	1 x10	8	3	185	18.50	10	1 x10	10	3	215	21.50
11⅝	1 x 4	8	2	78	7.75	11⅝	1 x 4	10	2	88	8.75
11⅝	1 x 6	8	3	117	11.75	11⅝	1 x 6	10	3	130	13.00
11⅝	1 x 8	8	3	156	15.50	11⅝	1 x 8	10	3	175	17.50
11⅝	1 x10	8	3	195	19.50	11⅝	1 x10	10	3	225	22.50
12½	1 x 4	8	2	82	8.25	12½	1 x 4	10	2	92	9.25
12½	1 x 6	8	3	123	12.25	12½	1 x 6	10	3	137	13.75
12½	1 x 8	8	3	164	16.50	12½	1 x 8	10	3	182	18.25
12½	1 x10	8	3	205	20.50	12½	1 x10	10	3	235	23.50
8¼	1¼x 4	8	2	85	8.50	8¼	1¼x 4	10	2	96	9.50
8¼	1¼x 6	8	3	127	12.75	8¼	1¼x 6	10	3	144	14.50
8¼	1¼x 8	8	3	170	17.00	8¼	1¼x 8	10	3	192	19.25
8¼	1¼x10	8	3	212	21.25	8¼	1¼x10	10	3	240	24.00
9⅝	1¼x 4	8	2	90	9.00	9⅝	1¼x 4	10	2	100	10.00
9⅝	1¼x 6	8	3	135	13.50	9⅝	1¼x 6	10	3	152	15.25
9⅝	1¼x 8	8	3	180	18.00	9⅝	1¼x 8	10	3	202	20.25
9⅝	1¼x10	8	3	225	22.50	9⅝	1¼x10	10	3	253	25.25
10	1¼x 4	8	2	95	9.50	10	1¼x 4	10	2	105	10.50
10	1¼x 6	8	3	140	14.00	10	1¼x 6	10	3	157	15.75
10	1¼x 8	8	3	188	18.75	10	1¼x 8	10	3	210	21.00
10	1¼x10	8	3	235	23.50	10	1¼x10	10	3	263	26.25
11⅝	1¼x 4	8	2	98	9.75	11⅝	1¼x 4	10	2	110	11.00
11⅝	1¼x 6	8	3	147	14.75	11⅝	1¼x 6	10	3	164	16.50
11⅝	1¼x 8	8	3	196	19.50	11⅝	1¼x 8	10	3	218	21.75
11⅝	1¼x10	8	3	245	24.50	11⅝	1¼x10	10	3	273	27.25
12½	1¼x 4	8	2	102	10.25	12½	1¼x 4	10	2	113	11.25
12½	1¼x 6	8	3	153	15.25	12½	1¼x 6	10	3	170	17.00
12½	1¼x 8	8	3	204	20.50	12½	1¼x 8	10	3	226	22.50
12½	1¼x10	8	3	255	25.50	12½	1¼x10	10	3	283	28.25

Elevators—Fair's Patent

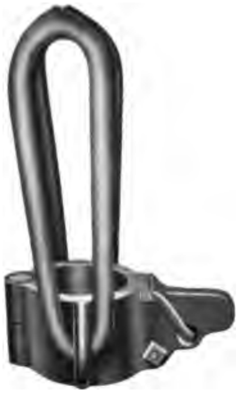
FOR LOWERING AND RAISING TUBING, DRIVE PIPE OR CASING

REGULAR PATTERN



MALLEABLE IRON

Fig. 224



WROUGHT IRON

Fig. 225

PRICES AND WEIGHTS PER SET OF TWO

MALLEABLE IRON

Size ....inches	⅜	½	¾	1	1¼	1½	2	2½	3
Diameter links....inches	¾	¾	¾	¾	¾	¾	¾	¾	¾
Weight ....pounds	17	16	16	15	15	26	40	44	50
Price ....per set	$5.50	$5.50	$5.50	$6.00	$6.50	$7.00	$8.50	$9.00	$10.00
Size ....inches	3¼	3½	4	4¼	4½	5	5⅝	6¼	.....
Diameter links....inches	¾	¾	⅞	⅞	⅞	⅞	1	1	.....
Weight ....pounds	50	52	56	56	54	63	68	90	.....
Price ....per set	$10.00	$11.00	$13.00	$13.00	$14.00	$14.00	$15.00	$16.00	.....

WROUGHT IRON

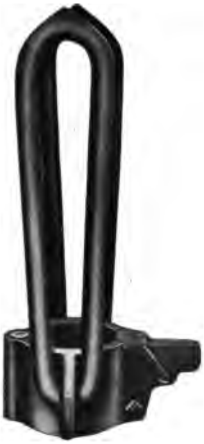
Size ....inches	¾	1	1¼	1½	2	2½	3	3½
Diameter links...........inches	1¼	1¼	1¼	1¼	1¼	1¼	1¼	1¼
Weight ....pounds	38	37	41	40	80	88	100	100
Price ....per set	$21.00	$21.00	$22.00	$22.00	$24.00	$26.00	$27.00	$30.00
Size ....inches	4	4¼	4½	5⅝	6	6¼	6⅝	7⅝
Diameter links...........inches	1¼	1¼	1¼	1½	1½	1½	1½	1½
Weight ....pounds	110	110	154	200	240	240	218	358
Price ....per set	$32.00	$32.00	$38.00	$47.00	$50.00	$50.00	$52.00	$61.00
Size ....inches	8	8¼	9⅝	10	11⅝	12	13 o.d.	14 o.d.
Diameter links...........inches	1½	1½	1¾	1¾	1¾	1¾	1¾	2
Weight ....pounds	314	314	400	400	430	420	450	480
Price ....per set	$62.00	$62.00	$75.00	$75.00	$80.00	$95.00	$95.00	$135.00

Elevators—Fair's Patent

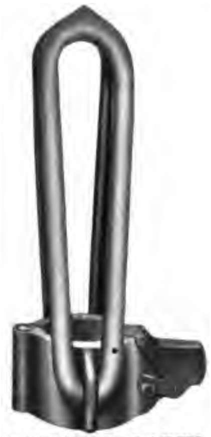
FOR LOWERING AND RAISING TUBING, DRIVE PIPE OR CASING

MANNINGTON PATTERN

WROUGHT IRON—EXTRA HEAVY



REGULAR LATCH
Fig. 226



IMPROVED LATCH
Fig. 227

PRICES AND WEIGHTS PER SET OF TWO

REGULAR LATCH

Size ....inches	2	2½	3	3½	4	4½	5	5	5⅝	5⅝
Diameter links.inches	1¼	1¼	1¼	1¼	1¾	1¾	1¾	2	2	2¼
Weight ......pounds	162	167	184	184	236	236	356	500	440	530
Price ....per set	$40.00	43.00	50.00	50.00	60.00	60.00	85.00	97.00	99.00	116.00
Size ....inches	6¼	6¼	6⅝	6⅝	7⅝	7⅝	8¼	8¼	9⅝	9⅝
Diameter links.inches	2	2¼	2	2¼	2	2¼	2	2¼	2	2¼
Weight ......pounds	475	542	485	552	493	560	546	613	655	730
Price ....per set	$104.00	116.00	109.00	121.00	110.00	131.00	115.00	136.00	125.00	137.00
Size ....inches	10	10	11⅝	11⅝	12½	12½	14 o.d.	16 o.d.	.....	.....
Diameter links.inches	2	2¼	2	2¼	2	2¼	2¼	2½	.....	.....
Weight ......pounds	677	752	782	858	860	935	975	1427	.....	.....
Price ....per set	$150.00	162.00	170.00	175.00	175.00	180.00	300.00	325.00	.....	.....

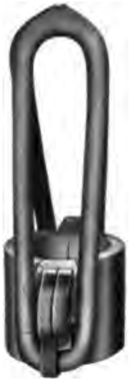
IMPROVED LATCH

Size ....inches	4	4½	5	5	5⅝	5⅝	6¼	6¼
Diameter links ....inches	1¾	1¾	1¾	2	2	2¼	2	2¼
Weight ....pounds	350	350	356	500	440	530	475	542
Price ....per set	$97.00	$97.00	$105.00	$117.00	$119.00	$136.00	$124.00	$136.00
Size ....inches	6⅝	6⅝	7⅝	7⅝	8¼	8¼	9⅝	9⅝
Diameter links ....inches	2	2¼	2	2¼	2	2¼	2	2¼
Weight ....pounds	485	552	493	560	546	613	655	730
Price ....per set	$129.00	$141.00	$130.00	$151.00	$135.00	$156.00	$145.00	$157.00
Size ....inches	10	10	11⅝	11⅝	12½	12½	14 o.d.	16 o.d.
Diameter links ....inches	2	2¼	2	2¼	2	2¼	2¼	2½
Weight ....pounds	677	752	782	858	860	935	975	1427
Price ....per set	$170.00	$182.00	$195.00	$200.00	$200.00	$205.00	$325.00	$350.00

Elevators—Scott's Patent

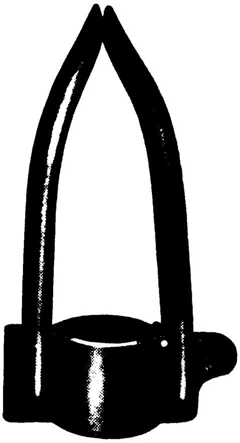
FOR LOWERING AND RAISING TUBING, DRIVE PIPE OR CASING

WROUGHT IRON



REGULAR PATTERN

Fig. 228



MANNINGTON PATTERN

Fig. 229

PRICES AND WEIGHTS PER SET OF TWO

REGULAR PATTERN

Size ....inches	1	1¼	1½	2	2½*	3*	3½*	4*	4½	5
Weight ....pounds	44	44	49	100	104	126	130	132	132	185
Price ....per set	$27.00	$28.00	$28.00	$36.00	$72.00	$72.00	$86.00	$86.00	$60.00	$31.00

Size ....inches	5⅝	6	6¼	6⅝	7⅝	8	8¼	9⅝	10	.....
Weight ....pounds	200	208	208	210	234	256	256	363	386	.....
Price ....per set	$62.00	$63.00	$63.00	$64.00	$65.00	$66.00	$66.00	$87.00	$87.00	.....

MANNINGTON PATTERN—EXTRA HEAVY

Size ....inches	2*	3*	4	4½	5	6	6	6¼
Diameter links ....inches	1¼	1¼	1½	1¾	1¾	2	2¼	2
Weight ....pounds	160	174	280	380	388	477	544	477
Price ....per set	$102.00	$110.00	$90.00	$90.00	$95.00	$109.00	$121.00	$109.00

Size ....inches	6¼	6⅝	6⅝	8	8	8¼	8¼	10
Diameter links ....inches	2¼	2	2¼	2	2¼	2	2¼	2
Weight ....pounds	544	483	550	568	644	568	644	670
Price ....per set	$121.00	$114.00	$126.00	$110.00	$131.00	$110.00	$131.00	$130.00

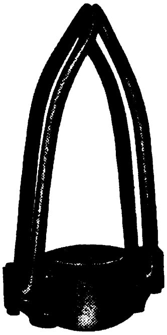
Size ....inches	10	12½	12½	14 o.d.	15 o.d.	16 o.d.	......	......
Diameter links ....inches	2¼	2	2¼	2¼	2¼	2½	......	......
Weight ....pounds	746	963	1038	......	......	......	......	......
Price ....per set	$142.00	$175.00	$180.00	$195.00	$250.00	$275.00	......	......

*Indicates hand forged.

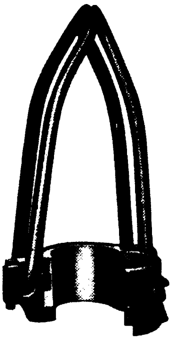
Elevators—Wilson's Patent

FOR LOWERING AND RAISING TUBING, DRIVE PIPE OR CASING

WROUGHT IRON



SHOWING ELEVATOR CLOSED
Fig. 230



SHOWING ELEVATOR OPEN
Fig. 231

PRICES AND WEIGHTS PER SET OF TWO

REGULAR PATTERN

Size ....inches	3	4	4¼	4½	5⅝	6	6¼	6⅝
Diameter of links......inches	1¼	1¾	1¾	1¾	2¼	2¼	2¼	2¼
Length of links..........feet	3	3	3	3	3	3	3	3
Weight ....pounds	120	320	315	315	680	680	675	675
Price ....per set	$55.00	$91.00	$91.00	$91.00	$158.00	$158.00	$158.00	$158.00

Size ....inches	7⅝	8	8¼	9⅝	10	11⅝	12½	15½
Diameter of links......inches	2¼	2¼	2¼	2¼	2¼	2¼	2¼	2¼
Length of links..........feet	3	3	3	3	3	3	3	3
Weight ....pounds	700	740	740	810	880	915	980	1080
Price ....per set	$170.00	$176.00	$176.00	$285.00	$293.00	$310.00	$336.00	$406.00

These elevators can be furnished with special 2¼-inch extra long links for circulator use or 2½-inch links at slight additional expense.

EXTRA HEAVY PATTERN—REGULAR LENGTH LINKS

Size ....inches	4	4¼	4½	6¼	6⅝	8¼	10	12½
Diameter of links......inches	2¼	2¼	2¼	2½	2½	2½	2½	2½
Length of links..........feet	3	3	3	3	3	3	3	3
Weight ....pounds	625	625	625	1000	1000	1160	1300	1450
Price ....per set	$210.00	$210.00	$210.00	$285.00	$285.00	$300.00	$360.00	$420.00

EXTRA HEAVY PATTERN—EXTRA LONG LINKS

Size ....inches	6¼	6⅝	8¼	10	12½
Diameter of links ....inches	2½	2½	2½	2½	2½
Length of links........feet	6	6	6	6	6
Weight ....pounds	1310	1310	1470	1610	1760
Price ....per set	$325.00	$325.00	$340.00	$400.00	$460.00

EXTRA HEAVY PATTERN—WITHOUT LINKS

Size ....inches	4	4¼	4½	6¼	6⅝	8¼	10	12½
Weight ....pounds	225	225	225	460	460	620	760	910
Price ....per set	$160.00	$160.00	$160.00	$235.00	$235.00	$250.00	$310.00	$370.00

Single Link Elevators

(WITH ONE SET OF BUSHINGS)

FOR LOWERING AND RAISING DRIVE PIPE OR CASING

WROUGHT IRON

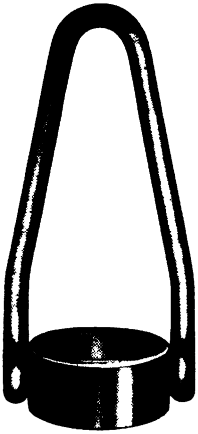


Fig. 232

TO BE USED WITH SPIDERS AND SLIPS

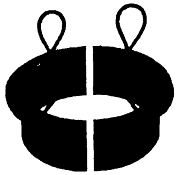


Fig. 233

Size .... inches	4½	6¼	6⅝	7⅝	8¼	9⅝
Diameter of links .... inches	3½	3½	3½	3½	3½	3½
Weight .... pounds	450	600	600	670	670	720
Price .... each	$160.00	$175.00	$175.00	$200.00	$200.00	$212.00
Size .... inches	**10**	**11⅝**	**12½**	**13½**	**15½**	......
Diameter of links .... inches	3½	3½	3½	3½	3½	......
Weight .... pounds	720	740	750	800	880	......
Price .... each	$212.00	$220.00	$225.00	$244.00	$255.00	......

EXTRA BUSHINGS

Size elevator .... inches	4½	6¼			8¼		
Size bushings .... inches	4½	4½	5⅝	6¼	6¼	6⅝	7⅝
Weight (per set) .... pounds	40	80	70	60	95	90	80
Price .... per set	$32.00	$45.00	$40.00	$39.00	$57.00	$55.00	$50.00

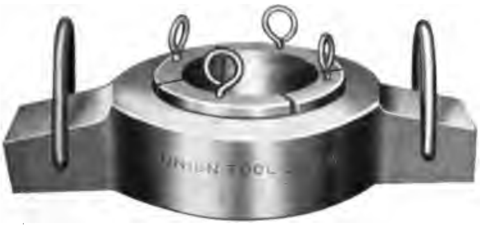
Size elevator .... inches	8¼	10			11⅝	
Size bushings .... inches	8¼	8¼	9⅝	10	9⅝	11⅝
Weight (per set) .... pounds	70	115	100	80	100	80
Price .... per set	$46.00	$60.00	$54.00	$50.00	$65.00	$54.00

Size elevator .... inches	12½		13½		15½	
Size bushings .... inches	10	12½	11⅝	13½	12½	15½
Weight (per set) .... pounds	110	85	115	100	210	125
Price .... per set	$68.00	$56.00	$80.00	$68.00	$90.00	$72.00

Spiders and Slips

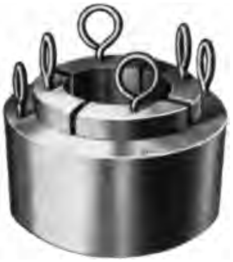
FORGED STEEL

ALSO KNOWN AS RINGS AND WEDGES



SPIDER AND SLIPS

Fig. 234



LINER AND SLIPS

Fig. 235

Used for pulling or holding up drive pipe or casing. Sometimes used with jack screws, but generally with hydraulic jacks. The spiders are very heavy and especially adapted for pulling long strings of heavy drive pipe or casing. Liners are used for reducing the size of spiders to adapt them for smaller size pipe or casing.

SPIDERS ONLY WITHOUT LINER OR SLIPS

Size ....inches	8¼	10	12½	13½	15½
Weight ....pounds	325	500	570	600	720
Price ....each	$40.00	$58.75	$68.75	$78.75	$95.00

LINERS ONLY

For size spider........inches	10	12½	13½	15½	
Size liner ....inches	10 to 8¼	12½ to 8¼	13½ to 8¼	12½ to 8¼	15½ to 12½
Weight ....pounds	75	160	220	160	165
Price ....each	$19.50	$26.90	$30.00	$26.90	$27.00

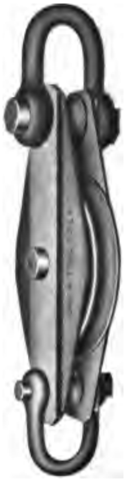
SLIPS

For size spider....inches	8¼		10		12½		13½		15½	
For size liner......inches	8¼		....		12½		....		....	
Size slips ....inches	Wt., Lbs.	Per Set	Wt., Lbs.	Per Set	Wt., Lbs.	Per Set	Wt., Lbs.	Per Set	Wt., Lbs.	Per Set
4½	140	$25.00	.....	......	.....	......	.....	......	.....	......
5	135	23.50	.....	......	.....	......	.....	......	.....	......
5⅝	120	22.75	.....	......	.....	......	.....	......	.....	......
6¼	105	22.00	.....	......	.....	......	.....	......	.....	......
6⅝	95	25.25	.....	......	.....	......	.....	......	.....	......
7⅝	75	24.25	.....	......	.....	......	.....	......	.....	......
8¼	60	23.00	.....	......	.....	......	.....	......	.....	......
9⅝	.....	......	95	$27.50	180	$32.50	225	$41.50	.....	......
10	.....	......	70	26.50	155	31.25	220	41.00	.....	......
11⅝	.....	......	.....	......	115	30.00	170	39.25	.....	......
12½	.....	......	.....	......	70	28.25	135	37.50	.....	......
13½	.....	......	.....	......	.....	......	85	35.00	200	$47.50
15½	.....	......	.....	......	.....	......	.....	......	105	45.00

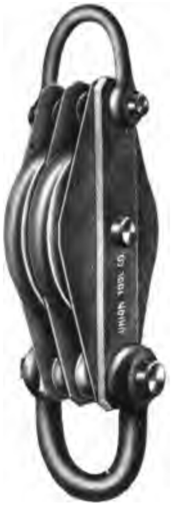
Tubing and Casing Blocks

FOR LOWERING AND RAISING TUBING, DRIVE PIPE OR CASING

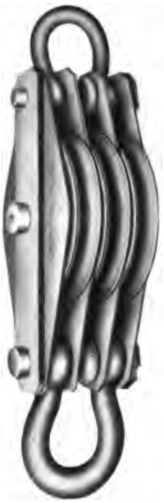
BRONZE BUSHED



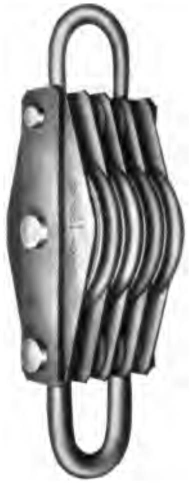
SINGLE
Fig. 236



DOUBLE
Fig. 237



TRIPLE
Fig. 238



QUADRUPLE
Fig. 239

Size, Inches	Size Sheave, Inches	Single		Double		Triple		Quadruple	
		Weight, Pounds	Price, Each	Weight, Pounds	Price, Each	Weight, Pounds	Price, Each	Weight, Pounds	Price, Each
20	12x2¾	125	$18.00	160	$38.00	270	$45.00	....	......
22	14x2¾	145	21.50	200	40.00	320	50.00	....	......
24	15x2¾	160	23.00	240	45.00	370	55.00	....	......
26	16x2¾	185	27.50	310	50.00	420	65.00	....	......
28	17x2$\frac{13}{16}$	225	35.00	380	55.00	470	70.00	....	......
32	18x2$\frac{13}{16}$	325	42.50	460	60.00	595	84.50	750	$ 93.35
36	20x3	...	.....	...	.....	1035	126.70	1240	140.00

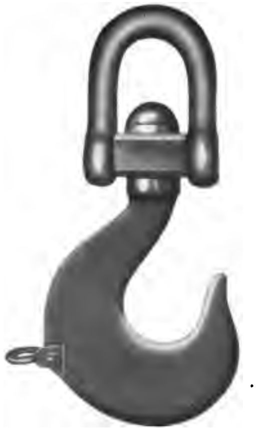


Fig. 240

TUBING AND CASING HOOKS

FORGED STEEL—DOUBLE SWIVEL

Diameter, Inches	Weight, Pounds	Price, Each
2½	60	$15.00
3	100	20.00
3½	130	25.00
4	160	32.00
4½	200	40.00
5	250	48.25
5½	350	56.25
6	425	65.00
6½	490	70.00

Manila Bull Ropes

Manila Calf Ropes

Manila Drilling Cables

Wire Drilling Lines

Wire Tubing Lines

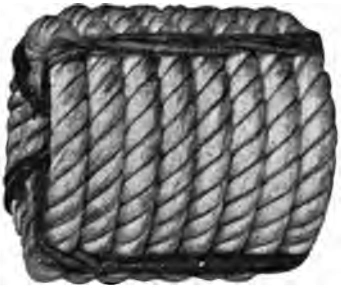
Wire Casing Lines

Wire Sand Lines

Wire Pumping Lines

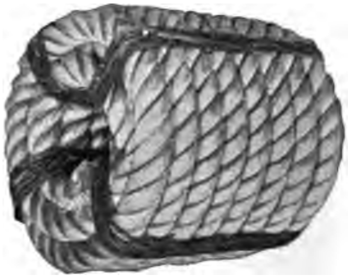
Pages 107 to 111 Inclusive

Oil Well Cordage



BULL ROPE
Fig. 241

Made from pure Manila hemp, shroud laid. Used on the bull wheel in an oil well derrick, and are usually from 85 to 90 feet in length and from 2¼ to 2½ inches in diameter.



CALF ROPE
Fig. 242

Made from pure Manila hemp, shroud laid. Used on the calf wheel in an oil well derrick, and are usually from 50 to 60 feet in length and from 2⅝ to 3 inches in diameter.

BULL ROPE COUPLINGS

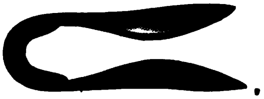


Fig. 243

Diameter of Rope, Inches	Weight Per Set of Two, Pounds	Price, Per Set of Two
2¼ and 2½	7	$1.00
3	10	2.50

Manila Drilling Cables

Made from superior Cebu hemp, characterized by its toughness and wearing qualities. Drilling cables differ from ordinary rope in that while ordinary rope is composed of three strands laid together, drilling cables are composed of three ropes of three strands each, laid together into one rope. It is harder than regular rope and well filled with oil to preserve its life.

This is the hardest laid cordage possible, and is made so that it prevents the water from making it soft and mushy.

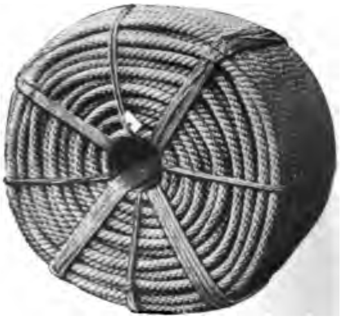


Fig. 244

APPROXIMATE WEIGHT, LENGTH, STRENGTH AND CAPACITY

Diameter in Inches	Circumference in Inches	Number of Pounds Per Foot	Capacity in Feet	Breaking Strain in Pounds
¾	2¼	.259	41200	6340
⅞	2¾	.354	30200	7500
1	3	.462	23150	10270
1⅛	3½	.505	21200	12000
1¼	3¾	.617	17330	13420
1½	4½	.949	12400	18920
1⅝	5	1.11	10600	23112
1¾	5¼	1.28	9170	25360
1⅞	5½	1.47	8000	27725
2	6	1.58	7430	35430
2⅛	6½	1.75	6700	41088
2¼	7	1.90	6200	47170
2½	7½	2.47	4760	53665

Weights of rope are liable to vary either way.

The United States Navy standard for working strain is one-half the breaking strain for hoisting purposes where work is not continuous, but to get the best results from cables they should not be subjected to more than five per cent of their breaking strain.

Wire Rope

OIL WELL LINES

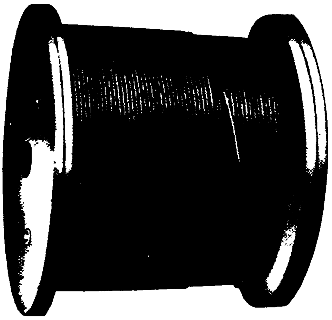


Fig. 245

SPECIAL CRUCIBLE CAST STEEL DRILLING LINES

RIGHT OR LEFT LAY

Composed of six strands of nineteen wires each and a hemp center.

Fig. 246

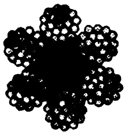


Fig. 247

This line is made of special grade steel peculiarly adapted for drilling purposes. The method of construction, and the quality of core used, impart the necessary elasticity so essential in a drilling line.

Diameter in Inches	Circumference in Inches	List Price Per Foot	Approx. Weight Per Foot in Pounds	Approx. Strength in Tons of 2000 lbs.	Proper Working Load in Tons of 2000 lbs.	Diameter of Drum or Sheave in Feet Advised
5/8	2	$0.16½	.62	14.0	2.80	2½
3/4	2¼	.22	.89	20.2	4.04	3
7/8	2¾	.29	1.20	26.	5.20	3½
1	3	.37	1.58	34.	6.80	4
1⅛	3½	.46	2.00	43.	8.60	4½
1¼	4	.56	2.45	53.	10.60	5

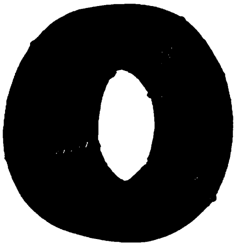


Fig. 248

CRUCIBLE CAST STEEL TUBING AND CASING LINES

Composed of six strands of nineteen wires each and a hemp center.

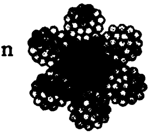


Fig. 249

Diameter in Inches	Circumference in Inches	List Price Per Foot	Approx. Weight Per Foot in Pounds	Approx. Strength in Tons of 2000 lbs.	Proper Working Load in Tons of 2000 lbs.	Diameter of Drum or Sheave in Feet Advised
3/8	1⅛	$0.09½	.22	4.8	.96	1½
7/16	1¼	.10	.30	6.5	1.30	1¾
1/2	1½	.11	.39	8.4	1.68	2
9/16	1¾	.12	.50	10.0	2.00	2¼
5/8	2	.14	.62	12.5	2.5	2½
3/4	2¼	.19	.89	17.5	3.5	3
7/8	2¾	.24	1.20	23.	4.6	3½
1	3	.31	1.58	30.	6.0	4
1⅛	3½	.38	2.00	38.	7.6	4½
1¼	4	.46	2.45	47.	9.4	5

Wire Rope

OIL WELL LINES

CRUCIBLE CAST STEEL SAND LINES

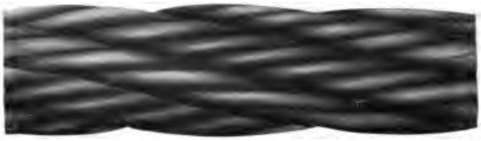


Fig. 250

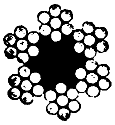


Fig. 251

Composed of six strands of seven wires each and a hemp center.

Diameter in Inches	Circumference in Inches	List Price Per Foot	Approx. Weight Per Foot in Pounds	Approx. Strength in Tons of 2000 lbs.	Proper Working Load in Tons of 2000 lbs.	Diameter of Drum or Sheave in Feet Advised
5/16	1	$0.04 1/2	.15	3.5	.70	2 1/4
3/8	1 1/8	.05 1/2	.22	4.6	.92	2 3/4
7/16	1 1/4	.06 1/2	.30	5.5	1.10	3
1/2	1 1/2	.08	.39	7.7	1.50	3 1/2
9/16	1 3/4	.10	.50	10.0	2.00	4
5/8	2	.12	.62	13.0	2.60	4 1/2
11/16	2 1/8	.14 1/2	.75	15.4	3.10	4 3/4
3/4	2 1/4	.17	.89	18.6	3.70	5
7/8	2 3/4	.22 1/2	1.20	24.0	4.80	6

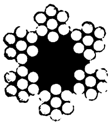


Fig. 252

CRUCIBLE CAST STEEL PUMPING LINES

Composed of six strands of seven wires each and a hemp center.

Diameter in Inches	Circumference in Inches	List Price Per Foot	Approx. Weight Per Foot in Pounds	Approx. Strength in Tons of 2000 lbs.	Proper Working Load in Tons of 2000 lbs.	Diameter of Drum or Sheave in Feet Advised
5/16	1	$0.04 1/2	.15	3.5	.70	2 1/4
3/8	1 1/8	.05 1/2	.22	4.6	.92	2 3/4
7/16	1 1/4	.06 1/2	.30	5.5	1.10	3
1/2	1 1/2	.08	.39	7.7	1.50	3 1/2
9/16	1 3/4	.10	.50	10.0	2.00	4
5/8	2	.12	.62	13.0	2.60	4 1/2
11/16	2 1/8	.14 1/2	.75	15.4	3.10	4 3/4
3/4	2 1/4	.17	.89	18.6	3.70	5
7/8	2 3/4	.22 1/2	1.20	24.0	4.80	6

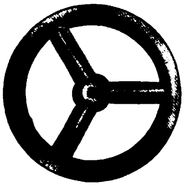


Fig. 253

Telegraph Wheels

8 inches in diameter, weight 3½ pounds.................. each $0.60
12 inches in diameter, weight 5½ pounds.................. each 1.25

Telegraph Cords

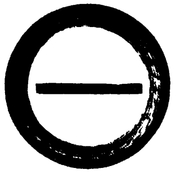


Fig. 254

To connect engine throttle with telegraph wheel in the derrick.

Galvanized wire, 150 feet long.. each $0.90

Weight, 2¾ pounds.

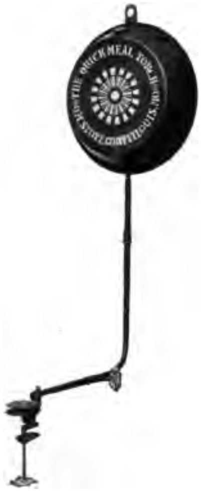


Fig. 255

Gasoline Wall Torches

These torches are made strong and durable, and are manufactured expressly for the oil well trade.

Gasoline wall torch with large burner and two-gallon tank ....per dozen $37.50

Extra burners...per dozen 22.50

Weight, complete torch, 5 pounds.

Derrick Lamps

CAST IRON

Weight, each..15 lbs.
Price, each..$1.50

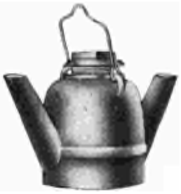


Fig. 256

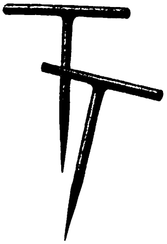


Fig. 257

Splicing Needles

Used for splicing wire rope.

Size, Inches	Weight, Pounds	Price, Each	Size, Inches	Weight, Pounds	Price, Each
6	¾	$1.10	10	2	$2.25
7	1	1.40	12	2¼	2.50
8	1½	1.75	14	3	2.75
9	1¾	2.10	15	3¼	2.75

Casing Heads

Circulating Heads

Hook Wall Packers

Anchor Clamps

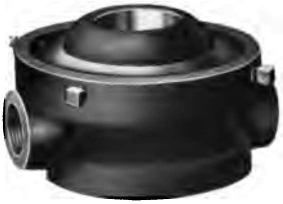
Packing Clamps

Casing Wagons

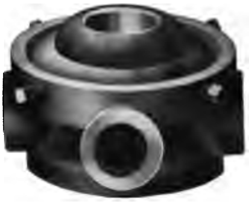
Pages 112 to 117 Inclusive

Common Casing Heads

CAST IRON



TWO WAY
Fig. 258



FOUR WAY
Fig. 259

Size ....inches	4½	5⅝	6	6¼	6⅝	7⅝
Number of threads per inch...	14-10-8	14-11½-10	8	11½-10	11½-10	11½-10
Price two way...........each	$4.50	$6.00	$ 7.00	$ 7.00	$ 7.00	$10.00
Price four way...........each	6.50	7.50	10.00	10.00	10.00	12.50
Weight each...........pounds	32	40	52	52	52	73
Size ....inches	8	8¼	9⅝	10	11⅝	12½
Number of threads per inch...	8	11½-10	11½-10	10-8	11½-10	11½-10
Price two way...........each	$10.00	$10.00	$13.00	$14.00	$15.00	$21.00
Price four way...........each	12.50	12.50	16.00	17.00	18.00	25.00
Weight each...........pounds	73	73	90	106	114	150

TOPS FOR COMMON CASING HEADS

CAST IRON

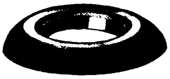


Fig. 260

For size casing head.....inches	4½	5⅝	6	6¼	6⅝	7⅝	8	8¼	9⅝	10	11⅝	12½
Weight each............pounds	5	7	12	12	12	14½	21	21	24	30	40	50
Price ....each	$0.40	.70	1.20	1.20	1.20	1.45	2.10	2.10	2.40	3.00	4.00	5.00

The holes in these tops are large enough to admit 3-inch tubing, and are so constructed that by changing the tubing ring 2, 2½ or 3-inch tubing can be used with the same casing head.

Tubing Rings—Cast Iron

Size of tubing................inches	2	2½	3
Weight each.................pounds	5	6	7
Price ....each	$0.60	.70	.80

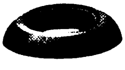


Fig. 261

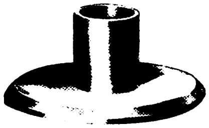


Fig. 262

Sand Line Caps

FOR MANILA OR WIRE ROPE

Fastened in the casing head. The sand pump line is put through it. Used while the well is flowing.

For size casing head...........inches	5⅝	6¼	6⅝	7⅝	8¼	9⅝	10
Weight each.................pounds	10½	13½	14½	18	20	26	30
Price ....each	$1.50	$1.60	$1.60	$2.00	$2.25	$3.25	$3.25

Willard Circulating Heads

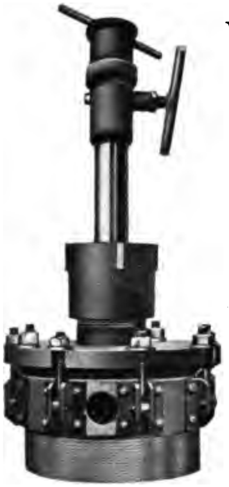


Fig. 263

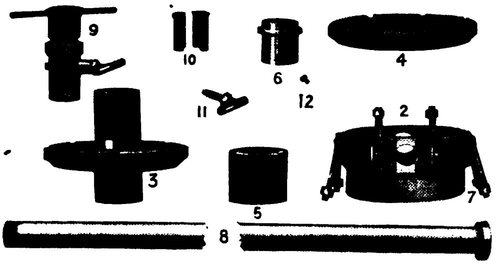


Fig. 264

Symbol Number	Size .... inches	PRICE—EACH 4½	5⅝	6¼	6⅝	7⅝	8¼
1	Head, complete	$100.00	$110.00	$115.00	$117.50	$120.00	$125.00
2	Steel ring	25.00	27.50	30.00	30.00	32.50	32.50
3	Stuffing box plate.................	20.00	20.00	22.50	22.50	25.00	25.00
4	Circulating plate	6.00	6.00	6.00	6.00	7.00	7.00
5	Stuffing box nut..................	6.00	6.00	6.00	6.00	6.00	6.00
6	Cast iron gland...................	3.00	3.00	3.00	3.00	3.00	3.00
7	Steel bolt	1.00	1.00	1.00	1.00	1.00	1.00
8	Plunger	30.00	30.00	30.00	30.00	30.00	30.00
9	Rope clamp, complete..............	30.00	30.00	30.00	30.00	30.00	30.00
10	Wire rope clamps................	3.00	3.00	3.00	3.00	3.00	3.00
11	Tee screw	3.00	3.00	3.00	3.00	3.00	3.00
12	Cap screw	.10	.10	.10	.10	.10	.10

Symbol Number	Size .... inches	PRICE—EACH 9⅝	10	11⅝	12½	13½	15½
1	Head, complete	$130.00	$130.00	$140.00	$140.00	$150.00	$175.00
2	Steel ring	35.00	35.00	40.00	40.00	50.00	60.00
3	Stuffing box plate.................	27.50	27.50	30.00	30.00	40.00	50.00
4	Circulating plate	8.00	8.00	9.00	9.00	12.00	16.50
5	Stuffing box nut..................	6.00	6.00	6.00	6.00	6.00	6.00
6	Cast iron gland...................	3.00	3.00	3.00	3.00	3.00	3.00
7	Steel bolt	1.00	1.00	1.00	1.00	1.00	1.00
8	Plunger	30.00	30.00	30.00	30.00	30.00	30.00
9	Rope clamp, complete..............	30.00	30.00	30.00	30.00	30.00	30.00
10	Wire rope clamps................	3.00	3.00	3.00	3.00	3.00	3.00
11	Tee screw	3.00	3.00	3.00	3.00	3.00	3.00
12	Cap screw	.10	.10	.10	.10	.10	.10

Circulating head complete consists of parts Nos. 2-3-4-5-6-8-9.
Circulating head complete less plunger and rope clamps consists of parts Nos. 2-3-4-5-6.

Symbol Number	Size .... inches	WEIGHT IN POUNDS—EACH 4½	5⅝	6¼	6⅝	7⅝	8¼	9⅝	10	11⅝	12½	13½	15½
1	Head, complete	279	325	325	326	357	359	381	385	415	420	523	593
2	Steel ring	...	26	27	28	36	38	46	49	56	61	69	77
3	Stuffing box plate..........	...	52	61	61	75	75	85	85	109	109	145	182
4	Circulating plate	...	34	40	40	50	50	58	58	81	81	104	128
5	Stuffing box nut............	20	20	20	20	20	20	20	20	20	20	20	20
6	Cast iron gland...........	8	8	8	8	8	8	8	8	8	8	8	8
7	Steel bolt	⅞	⅞	⅞	⅞	⅞	⅞	⅞	⅞	⅞	⅞	⅞	⅞
8	Plunger	140	140	140	140	140	140	140	140	140	140	140	140
9	Rope clamp, complete.......	29	29	29	29	29	29	29	29	29	29	29	29
10	Wire rope clamps	4	4	4	4	4	4	4	4	4	4	4	4
11	Tee screw	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½
12	Cap screw	⅛	⅛	⅛	⅛	⅛	⅛	⅛	⅛	⅛	⅛	⅛	⅛

Parts Nos. 5-6-7-8-9-10-11-12 are standard for all sizes.

Larkin's Hook Wall Packers

TO SET HOOK WALL PACKER

Lower packer within 10 or 12 inches of depth required to pack, turn tubing or casing one-half turn to left, unscrew, then lower until slips catch wall of well and support weight of tubing or casing.

Can be unset and raised or lowered without pulling out of well; can always be operated with the tubing or casing at top of well.

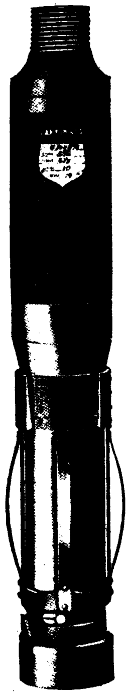


Fig. 265

For Size Casing, Inches	Size Tubing Connection, Inches	Length Rubber, Inches	Weight, Pounds	Price, Each
4½	2	10	55	$ 50.00
4½	2	12	55	54.00
5⅝	3	12	60	54.00
6¼	3	12	65	74.00
6⅝	3	12	80	74.00
7⅝	3	12	115	90.00
8¼	3	12	122	100.00
9⅝	3	13	190	150.00
10	3	13	220	150.00
11⅝	3	16	320	180.00
12½	3	16	340	220.00

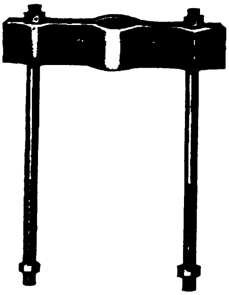
Any of the above packers can be furnished with special tops for shipment from the factory.

PARTS

Size, Inches	Rubbers	Slips Complete	Cone	Pipe	Regular Tops	Gas Escape Tops	Bottom Shoe
4½	$12.50	$13.00	$ 8.50	$ 9.00	$ 7.00	$10.00	$ 4.00
5⅝	14.00	14.00	10.00	11.00	8.00	13.00	4.00
6¼	16.00	17.00	13.50	13.00	11.00	14.00	4.00
6⅝	17.00	17.00	13.50	13.00	11.00	14.00	5.00
7⅝	22.00	18.00	15.00	15.00	12.00	15.00	5.00
8¼	24.00	20.00	19.00	19.00	14.00	18.00	8.00
9⅝	46.00	34.00	20.00	23.00	17.00	22.00	12.00
10	46.00	34.00	20.00	23.00	17.00	22.00	12.00
11⅝	56.00	40.00	24.00	26.00	24.00	34.00	20.00
12½	60.00	46.00	32.00	30.00	30.00	40.00	24.00

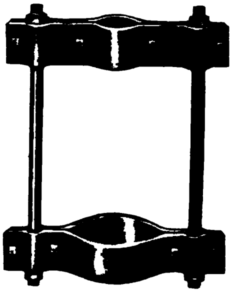
To determine the price of hook wall packers with gas escape top add to price of regular packer the difference between regular and gas escape top in the above list.

Anchor Clamps



TO FASTEN TUBING TO DERRICK SILLS
Fig. 266

Used to hold tubing in wells where gas pressure exceeds the weight of the tubing.



TO FASTEN TUBING TO DRIVE PIPE OR CASING
Fig. 267

TO FASTEN TUBING TO DERRICK SILLS

CLAMPS 43 INCHES LONG

Size of Tubing or Casing, Inches	SIZE OF IRON IN INCHES							
	⅝ x 2		¾ x 3		1 x 4		1 x 6	
	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each
2 or 2½	32	$3.50	58	$5.00	100	$8.50	150	$12.50
3 or 3½	33	3.50	59	5.00	101	8.65	152	12.75
4, 4¼, 4½ or 4¾	33½	3.65	60	5.15	103	8.75	154	13.00
5 or 5 3/16	33½	3.65	60	5.15	103	8.85	156	13.25
5⅝, 6, 6¼ or 6⅝	34	3.75	61	5.25	105	8.85	156	13.25
7⅝	34½	3.75	62	5.35	106	9.00	157	13.50
8 or 8¼	35	3.85	62	5.35	107	9.00	158	13.50
8⅝ or 9⅝	35½	3.85	63	5.40	109	9.25	159	13.75
10	36	4.00	64	5.40	110	9.25	160	14.00
10⅝	36	4.00	64	5.40	110	9.25	160	14.25
11⅝	37	4.00	66	5.50	113	9.50	162	14.50
12½	37	4.00	66	5.50	113	9.50	164	14.75

The above prices are for clamps only. For complete set add price of bolts given below.

TO FASTEN TUBING TO DRIVE PIPE OR CASING

CLAMPS 24 INCHES LONG

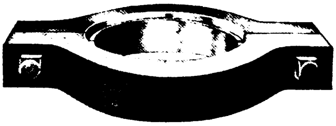
Size of Tubing or Casing, Inches	SIZE OF IRON IN INCHES							
	⅝ x 2		¾ x 3		1 x 4		1 x 6	
	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each
2 or 2½	19½	$2.75	34½	$4.00	58	$6.00	87	$ 9.25
3 or 3½	20	2.75	35	4.00	59	6.25	89	9.50
4, 4¼, 4½ or 4¾	20	2.85	36	4.15	60	6.40	91	9.75
5 or 5 3/16	20	2.85	36	4.15	61	6.40	93	10.00
5⅝, 6, 6¼ or 6⅝	21	2.90	37	4.25	63	6.50	93	10.00
7⅝	21½	2.90	38	4.25	64	6.75	94	10.25
8 or 8¼	21½	3.00	38½	4.35	65	6.75	95	10.25
8⅝ or 9⅝	22	3.00	39½	4.35	67	7.00	96	10.50
10 or 10⅝	22½	3.00	40	4.50	68	7.00	97	10.75
11⅝	23	3.25	40½	5.00	69	7.25	99	11.00
12½	23	3.25	40½	5.25	69	7.50	101	11.25

The above prices are for clamps only. For complete set add the price of one each tubing and drive pipe or casing clamp and two straight bolts.

ANCHOR BOLTS

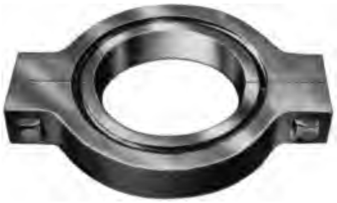
Size ....inches	¾x36	⅞x36	1x36	¾x40	⅞x40	1x40
Weight ....pounds	5	7	9	6	7½	10
Straight ....each	$0.55	$0.70	$0.85	$0.60	$0.75	$0.90
With hook one end.............each	....	....	....	1.20	1.35	1.50

Packing Clamps



SHOWING TOP VIEW

Fig. 268



SHOWING BOTTOM VIEW

Fig. 269

Size, Inches	Weight, Pounds	Price, Each	Size, Inches	Weight, Pounds	Price, Each
6¼ to 4½	75	$30.00	11⅝ to 6⅝	105	$42.50
6⅝ to 4½	75	30.00	11⅝ to 8¼	95	42.50
8¼ to 4½	120	35.00	12½ to 6¼	140	50.00
8¼ to 5⅝	120	35.00	12½ to 6⅝	135	50.00
8¼ to 6¼	110	35.00	12½ to 8¼	125	50.00
8¼ to 6⅝	95	35.00	12½ to 10	115	50.00
10 to 6¼	125	40.00	13½ to 6¼	165	60.00
10 to 6⅝	115	40.00	13½ to 8¼	140	60.00
10 to 8¼	100	40.00	13½ to 10	130	60.00
11⅝ to 6¼	115	42.50			

Casing Wagons

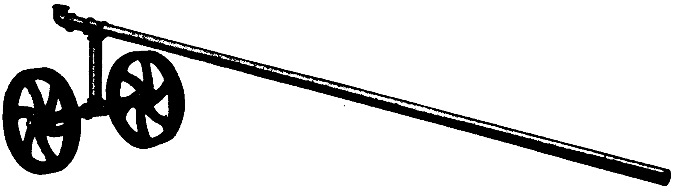


Fig. 270

Size Number	Diameter of Wheel, Inches	Face of Wheel, Inches	Weight Complete, Pounds	Price Complete, Each	Extra Wheels	
					Wt. Each, Pounds	Price, Each
1	7½	1⅞	33	$ 7.50	7	$0.85
2	11¾	2	54	10.00	17½	1.50

Steel Sucker Rods

Hardwood Sucker Rods

Sucker Rod Tools

Pumping Equipment

Deep Well Cylinders

Plunger Pumps

Plunger Pump Valves

Pages 118 to 131 Inclusive

Acme Steel Sucker Rods

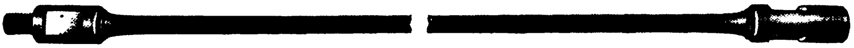


Fig. 271
WITH BOX AND PIN
FURNISHED IN 20-FOOT LENGTHS

Size rods ....inches	9/16	9/16	⅝	⅝	11/16	¾	¾	⅞
Size box and pin....inches	⅞	1⅛	⅞	1⅛	1⅛	1	1¼	1¼
Size square ....inches	¾	⅞	⅞	⅞	1	1⅛	1¼	1½
Diameter of joint....inches	1⅜	1½	1½	1½	1½	1⅝	2	2¼
For size tubing ....inches	2	2	2	2	2 or 2½	2½ or 3	3	3 or 4
Weight per 1000 feet....pounds	875	875	1080	1080	1360	1625	1700	2400
Price per foot....	$0.07½	$0.07½	$0.08½	$0.08½	$0.11	$0.18	$0.18	$0.30

STUB END JOINTS FOR WELDING

Size rods ....inches	9/16	⅝	11/16	¾	⅞
Size box and pin....inches	⅞ or 1⅛	⅞ or 1⅛	1⅛	1 or 1¼	1¼
Weight ....pounds	3¼	3½	5	8	10
Complete ....each	$0.60	$0.70	$1.00	$1.50	$2.00
Box only ....each	.30	.35	.50	.75	1.00
Pin only ....each	.30	.35	.50	.75	1.00

Acme Steel Sucker Rods

CALIFORNIA PATTERN

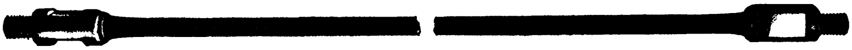


Fig. 272
PINS ON BOTH ENDS CONNECTED WITH MALLEABLE COUPLINGS
FURNISHED IN 20-FOOT LENGTHS

Size rods ....inches	11/16	¾	⅞
Size pins ....inches	1	1	1
Size square ....inches	1	1⅛	1¼
Diameter of joint ....inches	1½	1⅝	1⅞
For size tubing....inches	2 or 2½	2½ or 3	3 or 4
Weight per 1000 feet....pounds	1350	1575	2200
Price per foot	$0.11	$0.18	$0.30

The prices and weights shown are for rods without couplings.

STUB END PINS FOR WELDING

Size rods ....inches	11/16	¾	⅞
Size pins ....inches	1	1	1
Weight ....pounds	2	2½	3½
Price ....each	$1.00	$1.50	$2.00

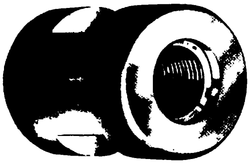


Fig. 273

Malleable Couplings

FOR CONNECTING ACME CALIFORNIA PATTERN SUCKER RODS

Size Number	Outside Diameter of Coupling, Inches	Length of Coupling, Inches	Size Square, Inches	Weight Each, Pounds	Price, Each
1	1½	3	1¼	1	$0.40
1½	1⅝	3	1¼	1¼	.40
2	1⅞	3	1¼	1½	.50
3	2	3	1¼	2	.60
4	2⅛	4	1¼	2¾	.70

These couplings are furnished with squares on two sides.

Octagon Hardwood Sucker or Pump Rods

FOR DEEP WELLS

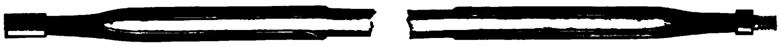


Fig. 274

Our wood pump rods are made of the best quality selected ash, and are furnished, unless otherwise specified, in random lengths of about 20 feet with forged steel couplings.

Size of Rod, Inches	Size of Box and Pin, Inches	Threads Per Inch	Size of Well		Weight per 100 Feet	
			Cylinder, Inches	Pipe, Inches	Uncoupled, Pounds	Coupled, Pounds
1⅜	⅞	10	2¼	2½	45	72
1⅝	⅞	10	2¾	3	75	102
1⅞	1	10	3¼	3½	103	153
2¼	1⅛	8	3¾	4	125	205
2¼	1⅛	8	4¼	4½	125	205
3	1½	8	4¾	5	240	350
3	1½	8	5¾	6	240	350
3½	1½	8	6¾	7	290	400
3½	1½	8	7¾	8	290	400

Net prices will be quoted upon application. State size and quantity wanted.

Forged Steel Sucker or Pump Rod Couplings

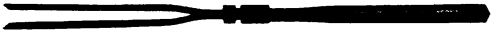


Fig. 275

FOR WOOD RODS
STRAIGHT BOX AND PIN

Number	1	2	5	7	10
For size wood rod..................inches	1⅛	1⅜ and 1⅝	1⅞	2¼	3 and 3½
Size box and pin..................inches	⅝	⅞	1	1⅛	1½
Number threads ....per inch	12	10	10	8	8
Number of rivets.......................	5	5	6	6	7
Size of rivets ....inches	3/16x1⅜	¼x1⅞	5/16x2⅜	5/16x2 11/16	7/16x3⅞
Size square for wrench............inches	⅝	⅞	1	1¼	1½
Length of straps..................inches	15¼	16	20	20	24
Total length of coupling............inches	36	39	47	48	60
Average weight ....pounds	2⅞	5½	8	12¾	26½
Black ....per pair	$1.10	$1.50	$2.10	$3.80	$9.50
Galvanized ....per pair	1.40	1.85	2.60	4.50	....

Galvanized couplings furnished to order only. Special and larger sizes made to order.

Sucker Rod Tools

COMMON SUCKER ROD HOOKS

For size rods..............inches	1⅝	1⅝, 1⅞	1⅞, 2¼	2¼, 3½
Weight ....pounds	5	10	15	20
Price ....each	$1.75	$2.25	$3.75	$5.50

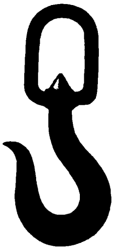


Fig. 276

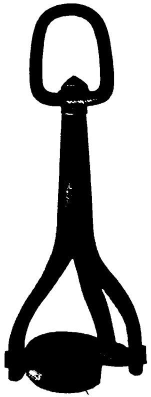


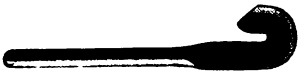
Fig. 277

Sucker Rod Elevators

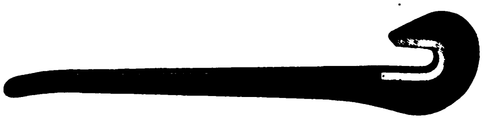
FOR EITHER WOOD OR IRON RODS

For ⅞, 1 or 1¼ inch squares			
Weight ....pounds	20	30	45
Per set	$7.00	$8.50	$12.00

Sucker Rod Wrenches



PATTERN OF SMALLER SIZES
Fig. 278



PATTERN OF LARGER SIZES
Fig. 279

Number	Size Square, Inches	For Size Joint, Number	Weight, Pounds	Price, Each
1	⅝	00, 0, 1	3	$0.65
3	⅞	2, 3, 4	4½	.75
5	1	5, 6	6	1.15
6	1⅛	5, 6	6	1.50
7	1¼	7	8½	2.50
9	1⅜	8, 9	9	2.50
10	1½	10	27	3.00

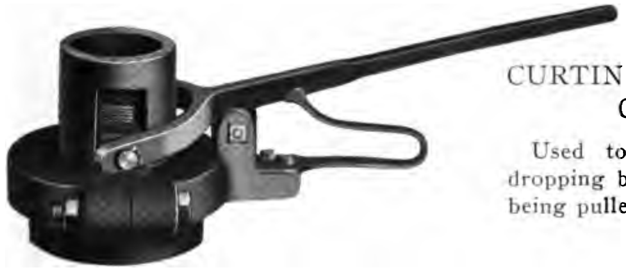


Fig. 280

CURTIN PATENT TUBING CATCHERS

Used to prevent tubing from dropping back into the well while being pulled.

For size tubing..............................inches	2	2½	3
Weight ....pounds	72	79	79
Price ....each	$25.00	$30.00	$30.00

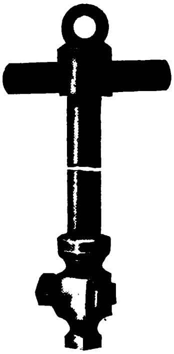
Pumping Equipment

A complete outfit for pumping an oil well consists of the following in addition to the necessary tubing and sucker rods.

- Adjuster.
- Adjuster board.
- Adjuster tee bolt.
- Polished rod.
- Polished rod sub.
- Valve sub.
- Stuffing box.
- Working barrel complete with standing valve and garbutt attachment.

Three to ten feet of perforated pipe.

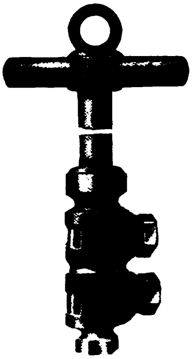
When a pumping jack is used, the adjuster, adjuster board, and tee bolt are not required.



SINGLE
Fig. 281

Adjusters

GRIP ADJUSTERS AND PARTS



DOUBLE
Fig. 282

	Single			Double		
For size polished rod..................inches	1⅛	1¼	1½	1⅛	1¼	1½
Weight complete (less grip pipe)........pounds	34	34	34	53	53	53
Price complete (less grip pipe)............each	$5.50	$5.50	$6.50	$8.50	$8.50	$10.00
PARTS						
Cross head only ....each	3.00	3.00	3.00	3.00	3.00	3.00
Body complete ....each	3.00	3.00	4.00	6.00	6.00	7.50
Body only ....each	1.75	1.75	2.00	3.50	3.50	3.50
Plug and nut ....each	1.25	1.25	2.00	1.25	1.25	2.00
Wrench ....each	2.00	2.00	2.00	2.00	2.00	2.00
Standard grip pipe, 2-inch x 8-foot..........each	3.00	3.00	3.00	.....	.....	.....
Extra heavy grip pipe, 2-inch x 8-foot......each	.....	.....	.....	4.50	4.50	4.50

LITTLE GIANT ADJUSTERS

For 1⅛ or 1¼ inch polished rods.

Weight each.........15 pounds Price each.........$3.00

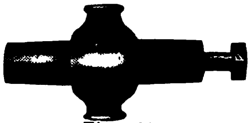


Fig. 283

Fig. 284

ADJUSTER BOARDS

Weight each......14 pounds Price each......$0.60

ADJUSTER TEE BOLTS

Diameter of bolt...............inches	⅞	1	1⅛	1¼
Length ....inches	20	20	20	20
Weight ....pounds	7	9¼	14¼	17
Price complete ....each	$1.25	$1.50	$2.00	$2.50
Price washers only..............each	.25	.30	.35	.40

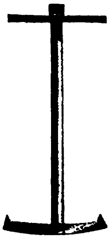


Fig. 285

Polished Rods

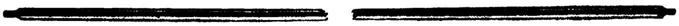


Fig. 286

MALE THREAD BOTH ENDS

Diameter, Inches	Length, Feet	Size Pin, Inches	Weight, Pounds	Price, Each
1⅛	10	½ pipe thread	34	$3.75
1⅛	10	¾ pipe thread	34	3.75
1⅛	10	⅞ bolt thread	34	3.75

Larger polished rods and special lengths furnished to order.

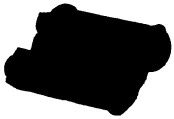


Fig. 287

Polished Rod Clamps

Size ....inches	1⅛	1¼
Weight ....pounds	5	5½
Price ....each	$0.70	$0.70

Polished Rod Eyes

FORGED STEEL

Size ....inches	½	¾	⅞
Weight ....pounds	1½	1½	1½
Price ....each	$2.00	$2.00	$2.50

Fig. 288

Substitutes

Used for connecting polished rods, sucker rods and valves of different size threads.

POLISHED ROD SUBS

Used for connecting polished rods with sucker rods.

Fig. 289

	Price Each
½ inch pipe box to ⅞ inch bolt box	$0.60
½ inch pipe box to ⅞-10 thread box	.60
½ inch pipe box to 1 -10 thread box	.60
½ inch pipe box to 1⅛-10 thread box	.75
½ inch pipe box to 1¼- 8 thread box	.75
¾ inch pipe box to ⅞ inch bolt box	.60
¾ inch pipe box to 1 -10 thread box	.60
¾ inch pipe box to 1⅛-10 thread box	.75
¾ inch pipe box to 1¼- 8 thread box	.75
⅞ inch bolt box to 1⅛-10 thread box	.75
⅞ inch bolt box to 1¼- 8 thread box	.75

VALVE SUBS

Used for connecting sucker rods to working valves and crowns.

Fig. 290

	Price Each
⅞ inch, 10 thread pin to ½ inch pipe box	$0.60
⅞ inch, 10 thread pin to ¾ inch pipe box	.60
1 inch, 10 thread pin to ½ inch pipe box	.60
1 inch, 10 thread pin to ¾ inch pipe box	.60
1⅛ inch, 10 thread pin to ½ inch pipe box	.75
1⅛ inch, 10 thread pin to ¾ inch pipe box	.75
1¼ inch, 8 thread pin to ¾ inch pipe box	.75

Brass Stuffing Boxes

HEXAGON PATTERN

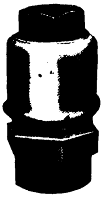


Fig. 291

Size polished rod......inches	1⅛	1⅛	1⅛	1¼	1¼	1¼
For size tubing........inches	2	2½	3	2	2½	3
Weight ....pounds	5	7	10	5	7	10
Complete ....each	$3.00	$4.50	$6.50	$3.25	$4.50	$6.50
Upper part .... "	1.25	1.75	2.25	1.35	1.75	2.25
Lower part .... "	1.50	2.50	3.25	1.65	2.50	3.25
Followers .... "	.50	.60	1.50	.55	.60	1.50

Cast Iron Flanged Stuffing Boxes

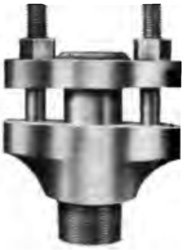


Fig. 292

Size polished rod......inches	1⅛	1⅛	1⅛	1¼	1¼	1¼
For size tubing........inches	2	2½	3	2	2½	3
Weight ....pounds	10	10½	12	10	10½	12
Complete ....each	$2.75	$3.25	$3.75	$2.75	$3.25	$3.75
Upper part .... "	1.25	1.50	1.75	1.25	1.50	1.75
Lower part .... "	1.75	2.00	2.35	1.75	2.00	2.35
Studs with nuts........ "	.40	.40	.40	.40	.40	.40

D and B Cast Iron Stuffing Boxes

(Patented)

Size polished rod....inches	1⅛	1⅛	1⅛	1¼	1¼	1¼
For size tubing......inches	2	2½	3	2	2½	3
Weight ....pounds	13	14	16	13	14	16
Complete ....each	$5.00	$5.25	$5.50	$5.00	$5.25	$5.50
Upper part .... "	2.00	2.25	2.50	2.00	2.25	2.50
Lower part .... "	3.00	3.50	3.50	3.00	3.50	3.50

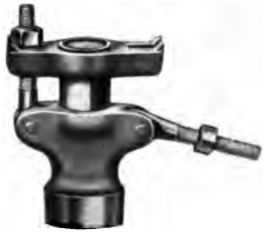


Fig. 293

Noxon Stuffing Boxes

CAST IRON

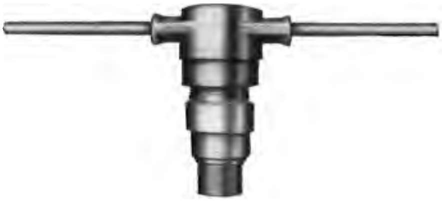


Fig. 294

Size polished rod..........................inches	1⅛	1⅛	1⅛
For size tubing ....inches	2	2½	3
Weight ....pounds	22	22½	23
Size of handles.............................inches	¾x8	¾x8	¾x8
Number of glands	2	2	2
Size of glands...............................inches	2⅛x2½	2⅛x2½	2⅛x2½
Price complete ....each	$8.00	$8.00	$8.00
Price of glands...............................each	.60	.60	.60

Deep Well Cylinders

ALL BRASS WITH BRONZE BALL VALVES

This is an all-brass artesian well cylinder for heavy service. It may be placed in open wells and in drilled wells where the pipe or casing is large enough to admit the cylinder attachments. To give the best results the cylinder should be submerged when the water is at its lowest level. Plunger is threaded for forged steel sucker rod couplings.

Inside Diameter, Inches	Length Stroke, Inches	Gallons Per Stroke	Length Cylinder, Inches	Outside Diameter Caps, Inches	Top and Bottom Connecting Pipes, Inches	Size of Pin in Plunger, Inches	Size of Octagon Wood Sucker Rod Recommended, Inches	Weight Cylinder, Pounds	Price, Each
1¾	10	.100	27	2 15/16	2	⅝	1⅛	12	$ 17.50
1¾	16	.160	33	2 15/16	2	⅝	1⅛	15	19.00
1¾	24	.250	41	2 15/16	2	⅝	1⅛	18	21.00
2¼	10	.172	29	3 9/16	2½	⅞	1⅝	19	26.00
2¼	16	.275	35	3 9/16	2½	⅞	1⅝	22	28.00
2¼	24	.410	43	3 9/16	2½	⅞	1⅝	25	30.00
2¼	36	.610	55	3 9/16	2½	⅞	1⅝	28	34.00
2¾	16	.411	37	3⅞	3	⅞	1⅝	31	36.00
2¾	24	.610	45	3⅞	3	⅞	1⅝	33	38.00
2¾	36	.925	57	3⅞	3	⅞	1⅝	38	42.00
3¼	16	.574	41	4 7/16	3½	1	1⅞	47	48.00
3¼	24	.862	49	4 7/16	3½	1	1⅞	50	52.00
3¼	36	1.292	61	4 7/16	3½	1	1⅞	56	58.00
3¾	16	.764	43	5⅛	4	1⅛	2¼	59	70.00
3¾	20	1.050	47	5⅛	4	1⅛	2¼	61	72.50
3¾	24	1.147	51	5⅛	4	1⅛	2¼	63	75.00
3¾	36	1.720	63	5⅛	4	1⅛	2¼	69	85.00
4¼	16	.982	45	5¾	4½	1⅛	2¼	77	90.00
4¼	20	1.230	49	5¾	4½	1⅛	2¼	79	92.50
4¼	24	1.473	53	5¾	4½	1⅛	2¼	81	95.00
4¼	36	2.210	65	5¾	4½	1⅛	2¼	87	105.00
4¾	16	1.227	47	6¼	5	1⅛	2¼	94	127.50
4¾	20	1.530	51	6¼	5	1⅛	2¼	96	131.50
4¾	24	1.840	55	6¼	5	1⅛	2¼	99	135.00
4¾	36	2.760	67	6¼	5	1⅛	2¼	107	150.00
5¾	16	1.798	54	7¼	6	1⅛	2¼	143	180.00
5¾	20	2.200	58	7¼	6	1⅛	2¼	146	187.50
5¾	24	2.696	62	7¼	6	1⅛	2¼	149	195.00
5¾	36	4.040	74	7¼	6	1⅛	2¼	159	217.50
6¾	16	2.479	59	8⅝	7	1½	3½	202	280.00
6¾	20	3.097	63	8⅝	7	1½	3½	205	290.00
6¾	24	3.716	67	8⅝	7	1½	3½	208	300.00
6¾	36	5.576	79	8⅝	7	1½	3½	220	335.00
7¾	20	4.080	66	9½	8	1½	3½	273	435.00
7¾	24	4.900	70	9½	8	1½	3½	277	450.00
7¾	36	7.340	82	9½	8	1½	3½	289	500.00
8¾	24	6.247	71	11	9	1½	3½	......	725.00
8¾	36	9.370	83	11	9	1½	3½	......	825.00
9½	24	7.240	76	12	10	2	3½	......	915.00
9½	36	11.020	88	12	10	2	3½	......	1000.00
11½	24	10.770	82	14	12	2	3½	......	1150.00
11½	36	16.160	94	14	12	2	3½	......	1250.00

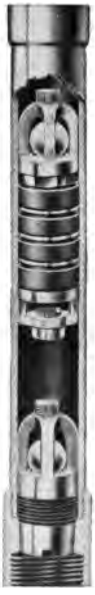


Fig. 295

WHEN ORDERING, GIVE THE INSIDE DIAMETER AND LENGTH OF STROKE.

D and B Liner Pumps

(Patented)

These pumps can be furnished in any length up to 20 feet and are fitted with liners which can be replaced when worn out. Each set of liners is furnished with a fitted plunger.

SHOWING SECTIONAL VIEW

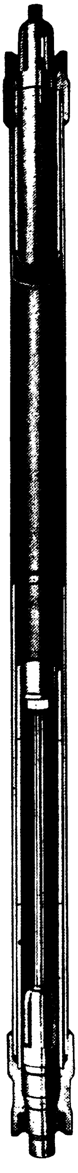


Fig. 296

REGULAR STYLE

Size No.	For Size Tubing, Inches	Length, Feet	Length Plunger, Inches	Weight Stripped, Pounds	Complete, Each	Stripped, Each	Liners Including Plunger, Per Set
160	2	6	44	88	$40.00	$30.00	$20.00
170	2	7	44	99	45.00	35.00	23.00
170-A	2	7	50	99	47.00	37.00	25.00
250	2½	5	44	108	61.00	44.00	26.00
260	2½	6	44	123	67.00	50.00	28.00
270-A	2½	7	50	137	72.00	55.00	35.00
270-B	2½	7	60	139	74.00	57.00	37.00
350	3	5	44	136	70.00	50.00	26.00
360	3	6	44	153	75.00	55.00	30.00
360-A	3	6	50	156	77.00	57.00	32.00
370	3	7	44	170	80.00	60.00	34.00
370-A	3	7	50	173	83.00	63.00	35.00
370-B	3	7	60	177	85.00	65.00	37.00
390-B	3	9	60	215	110.00	90.00	50.00
460	4	6	44	268	180.00	120.00	60.00

All regular style pumps furnished 11½ threads both ends.

All orders will be filled with regular style pumps unless Parker style is specified.

Unless otherwise specified, 5 and 6-foot pumps will be fitted with 44-inch plungers, 7-foot pumps with 50-inch plungers and 9-foot pumps with 60-inch plungers.

PARKER STYLE

Size Number	For Size Tubing, Ins.	Length, Feet	Length Plunger, Ins.	Thread	Weight Stripped, Lbs.	Complete Parker Improved, Each	Complete D and B Parker, Each	Stripped Either Style, Each	Liners Including Plunger, Per Set
166	2	6	44	11½	86	.....	$54.00	$30.00	$20.00
166-A	2	6	50	11½	88	.....	56.00	32.00	22.00
176	2	7	44	11½	99	.....	59.00	35.00	23.00
176-A	2	7	50	11½	101	.....	61.00	37.00	25.00
256	2½	5	44	11½	108	$84.00	72.00	44.00	26.00
266	2½	6	44	11½	122	88.00	76.00	48.00	28.00
266-A	2½	6	50	11½	124	92.00	80.00	52.00	32.00
276	2½	7	44	11½	139	93.00	81.00	53.00	33.00
276-A	2½	7	50	11½	141	95.00	83.00	55.00	35.00
335	3	3½	44	11½ & 8	97	.....	55.00	20.00	18.00
355	3	5	44	11½ & 8	132	90.00	78.00	46.00	26.00
356	3	5	44	11½	132	90.00	78.00	46.00	26.00
365	3	6	44	11½ & 8	149	99.00	87.00	55.00	30.00
366	3	6	44	11½	149	99.00	87.00	55.00	30.00
366-A	3	6	50	11½	151	101.00	89.00	57.00	32.00
366-B	3	6	60	11½	154	104.00	92.00	60.00	34.00
375	3	7	44	11½ & 8	170	104.00	92.00	60.00	34.00
376	3	7	44	11½	170	104.00	92.00	60.00	34.00
376-A	3	7	50	11½	173	107.00	95.00	63.00	35.00
376-B	3	7	60	11½	176	109.00	97.00	65.00	37.00

Unless otherwise specified, 5 and 6-foot pumps will be fitted with 44-inch plungers, 7-foot pumps with 50-inch plungers and 9-foot pumps with 60-inch plungers.

EXTRA PLUNGERS—FOR EITHER STYLE

For size tubing........inches	2	2½	3
44-inch plungers ....each	$ 8.00	$ 9.00	$10.00
50-inch plungers .... "	10.00	10.50	12.00
60-inch plungers .... "	12.00	13.50	15.00

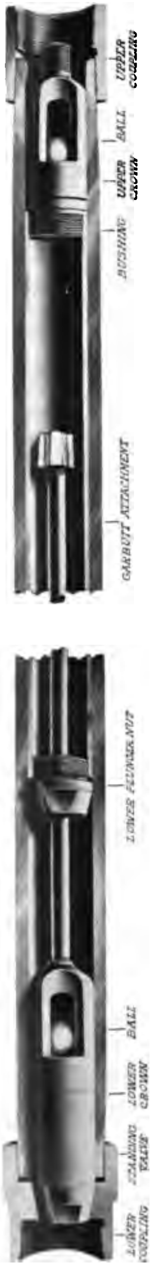
LINERS

Fig. 297

EXTERIOR VIEW

Fig. 298

Plain Plunger Pumps



PLAIN PLUNGER PUMP

Fig. 299

For Size Tubing, Inches	Length, Feet	Length Plunger, Inches	Stripped		Complete		Extra Bbls. Only, Each	Extra Plungers Only, Each
			Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each		
2	5½	44	52	$18.00	58	$24.00	$13.00	$ 8.00
2½	5½	44	103	32.00	115	45.60	24.00	9.00
3	5½	44	137	39.00	154	55.00	36.00	10.00

These pumps can be furnished with longer barrels and plungers at a slight additional expense.

Ideal Liner Pumps

For Size Tubing, Inches	Length, Feet	Length Plunger, Inches	Stripped		Complete		Liner Including Plunger	
			Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Each	Wt., Lbs.	Price, Per Set
2	6	44	90	$30.00	96	$54.00	43	$20.00
2	6	50	94	32.00	100	56.00	47	22.00
2	7	44	106	35.00	112	59.00	49	23.00
2	7	50	110	37.00	116	61.00	53	25.00
2½	5	44	98	44.00	108	72.00	45	28.00
2½	6	44	117	48.00	129	76.00	56	30.00
2½	6	50	122	52.00	134	80.00	61	32.00
2½	7	44	136	53.00	150	81.00	66	33.00
2½	7	50	141	55.00	155	83.00	71	35.00
3	3½	44	85	20.00	95	55.00	44	18.00
3	5	44	122	46.00	135	78.00	62	26.00
3	6	44	147	55.00	164	87.00	75	30.00
3	6	50	153	57.00	170	89.00	81	32.00
3	6	60	163	60.00	180	92.00	91	34.00
3	7	44	172	60.00	190	92.00	87	34.00
3	7	50	178	63.00	196	95.00	93	35.00
3	7	60	188	65.00	206	97.00	103	37.00

Unless otherwise specified, 44-inch plungers will be furnished with 3½, 5 and 6-foot pumps and 50-inch plungers with 7-foot pumps.

EXTRA PLUNGERS FOR IDEAL LINER PUMPS

For size tubing .... inches	2	2½	3
44-inch plungers .... each	$ 8.00	$ 9.00	$10.00
50-inch plungers .... "	10.00	10.50	12.00
60-inch plungers .... "	12.00	13.50	15.00

Extension Standing Valve Barrels

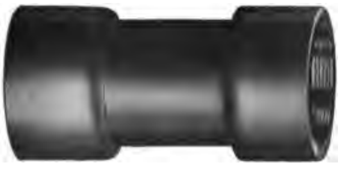
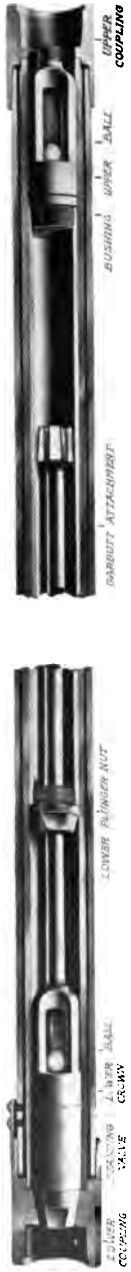


Fig. 300

For size tubing .... inches	2	2½	3
Weight .... pounds	7½	10	15
Price .... each	$4.00	$4.50	$5.00



IDEAL LINER PUMP

Fig. 301

Brass Valves—For Plunger Pumps

WITH LONG BRASS OR STEEL CROWNS, BALLS AND SEATS

SINGLE BALL VALVES

UPPER OR WORKING VALVE

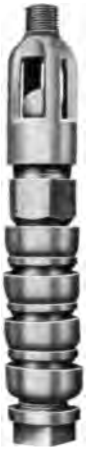


Fig. 302

LOWER OR STANDING VALVE

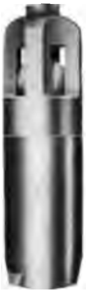


Fig. 303

Furnished Either Leather or Babbitt Packed

Size tubing ....ins.	2	2½	3
Inside diam. of barrel..ins.	1¾	2¼	2¾
Upper valve ....each	$4.50	8.50	11.50
Lower valve, either leather or Babbitt packed...each	3.00	6.00	8.00

DOUBLE BALL VALVES

UPPER OR WORKING VALVE

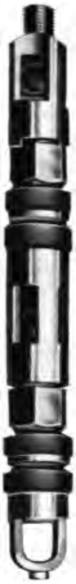


Fig. 304

LOWER OR STANDING VALVE

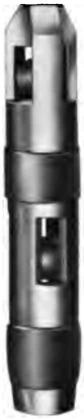


Fig. 305

Furnished Either Leather or Babbitt Packed

Size tubing ....ins.	2	2½	3
Inside diam. of barrel..ins.	1¾	2¼	2¾
Upper valve ....each	$5.50	11.00	15.00
Lower valve, either leather or Babbitt packed..each	4.00	8.00	12.00

BARREL OR SLEEVE

FOR UPPER OR WORKING VALVE

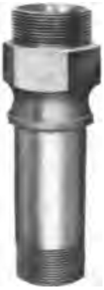


Fig. 306

BARREL OR SLEEVE

FOR LOWER OR STANDING VALVE

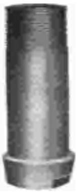


Fig. 307

CUP RING

FOR UPPER OR WORKING VALVE AND FOUR CUP PLUNGER EXTENSION

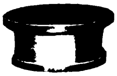


Fig. 308

Size tubing ....inches	2	2½	3
Inside diameter of barrel ....inches	1¾	2¼	2¾
Barrel or sleeve for upper or working valve...................each	$1.10	$1.65	$2.75
Barrel or sleeve for lower or standing valve.................. "	.75	1.35	2.00
Lower part or loop for upper or working valve................ "	.40	.65	.90
Cup rings for upper valve and four cup plunger extension...... "	.25	.40	.50

All valves furnished with brass or steel crowns, balls and seats as desired. Any of these valves can be furnished all steel. Prices upon application.

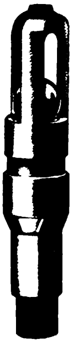


Fig. 309

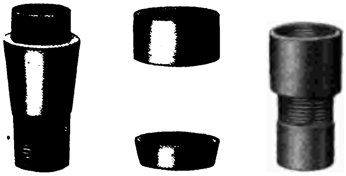


Fig. 310

D and B Standing Valves

(Patented)

Size tubing ....inches	2	2½	3
Inside diameter of barrel ....inches	1¾	2¼	2¾
Weight complete ....pounds	2¾	4¾	7½
Price complete ....each	$8.00	$10.00	$12.00
PARTS			
Sleeve complete (less crown, ball and seat)......each	5.00	6.00	7.00
Alloy rings ....each	.50	.60	.70

Plunger Bushings

Used to connect crown with plunger in pump.

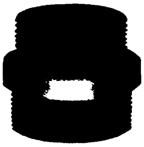


Fig. 311

Size tubing ....inches	2	2½	3
Inside diameter of barrel..............inches	1¾	2¼	2¾
Plunger bushings, brass ....each	$0.75	$1.00	$1.50
Plunger bushings, steel ....each	.75	1.00	1.50

Plunger Nuts

Put in lower end of plunger to lift Garbutt rod.

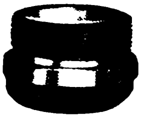


Fig. 312

Size tubing ....inches	2	2½	3
Inside diameter of barrel..............inches	1¾	2¼	2¾
Plunger nuts, brass ....each	$0.75	$1.00	$1.50
Plunger nuts, steel ....each	.75	1.00	1.50

Garbutt Attachments

(Patented)

FOR PULLING LOWER OR STANDING VALVE

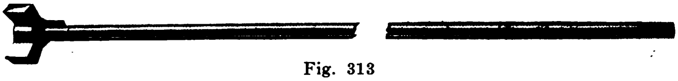


Fig. 313

Size tubing ....inches	2	2½	3
Inside diameter of barrel ....inches	1¾	2¼	2¾
Diameter of rod ....inches	½	⅝	⅝
Length of rod ....inches	42	42	42
Threads per inch..................................	11½	11½	11½
Price, with brass nuts ....each	$2.50	$2.75	$2.75
Price, with steel nuts ....each	2.70	3.15	3.15

Extra Nuts

FOR GARBUTT ATTACHMENTS

Size tubing ....inches	2	2½	3
Inside diameter of barrel..............inches	1¾	2¼	2¾
Diameter of rod ....inches	½	⅝	⅝
Threads per inch..........................	12	11	11
Price, brass ....each	$0.30	$0.50	$0.50
Price, steel ....each	.60	.90	.90

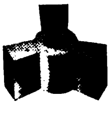


Fig. 314

Four Cup Plunger Extensions

An extra attachment for bottom of plunger.

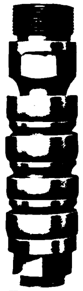


Fig. 315

Size tubing ... inches	2	2½	3
Inside diameter of barrel ... inches	1¾	2¼	2¾
Price ... each	$2.00	$3.50	$5.00

Crowns

EXTRA LONG—CALIFORNIA PATTERN

Three or four arch.

UPPER CROWN

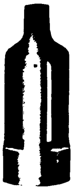


Fig. 316

LOWER CROWN

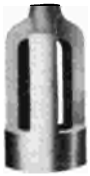


Fig. 317

Size tubing ... inches	2	2½	3
Inside diameter of barrel ... inches	1¾	2¼	2¾
Upper crowns, brass ... each	$2.50	$3.50	$4.50
Upper crowns, steel ... “	2.50	3.50	4.50
Lower crowns, brass ... “	2.50	3.50	4.50
Lower crowns, steel ... “	2.50	3.50	4.50

Balls and Seats

REVERSIBLE VALVE SEAT

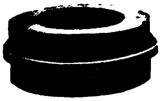


Fig. 318

VALVE BALL

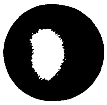


Fig. 319

For size valve ... inches	1¾	2¼	2¾
Diameter of ball ... inches	1	1¼	1½
Brass balls ... each	$0.40	$0.60	$0.90
Steel balls ... “	.20	.30	.50
Reversible brass seats ... “	.30	.50	.60
Reversible steel seats ... “	.30	.50	.60
Darling reversible steel seats ... “	.60	1.00	1.25
Reversible steel seats with balls ground to fit ... per set	.70	1.15	1.50
Darling reversible steel seats with balls ground to fit ... per set	1.15	2.00	2.50

Valve Cups

LEATHER

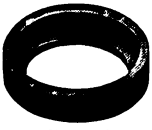


Fig. 320

BOW SPRING

Fig. 321

CANVAS

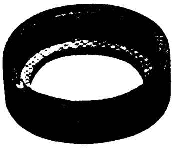


Fig. 322

DARCOVA

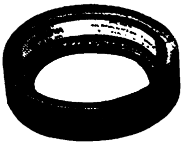


Fig. 323

Size ... inches	⅞ to 1½	1¾	2¼	2¾
Darling special leather cups ... each	$0.10	$0.10	$0.15	$0.25
Bow spring cups ... “	.15	.20	.30	.35
Everlasting canvas cups ... “	.....	.10	.12	.14
Wear Well cups ... “	.25	.30	.40	.60
Darcova cups ... “	.25	.25	.50	.75

Leather Valve Rings

Fig. 324

Size ... inches	1¾	2¼	2¾
Price ... per hundred	$1.00	$2.40	$3.00

Landas Upper Valves

For use in wells that contain sand.

The rope packing is kept constantly expanded by a sliding follower with a coil spring above.

LANDAS UPPER VALVE

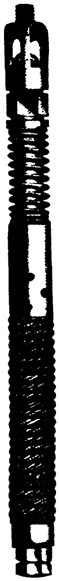


Fig. 325

Inside diameter of barrel.......inches	1¾	2¼	2¾	3¾
Price complete ....each	$8.00	$15.00	$25.00	$40.00

PARTS OF LANDAS VALVES

For size valve ....inches	1¾	2¼	2¾	3¾
Balls ....each	$0.40	$1.25	$1.75	$2.00
Seats .... "	.40	.80	1.00	1.75
Locknuts .... "	.40	.60	1.25	2.00
Followers .... "	2.00	3.00	4.00	6.50
Springs .... "	.80	1.00	1.75	2.00
Set screws .... "	.10	.10	.20	.25
Tubes .... "	1.50	3.25	6.00	9.00
Crowns .... "	1.00	2.50	5.00	8.00
Bottoms .... "	.50	1.00	2.50	4.00
Seat frames .... "	1.00	1.50	2.75	4.50

Cotton rope for Landas valve....................................	per foot	$0.02½
Hemp rope for Landas valve......................................	per foot	.03

Kinney Upper Gas Valves

This valve is used for pumping fluid where the pressure of gas prevents the ball in a regular valve from working properly.

KINNEY UPPER GAS VALVE

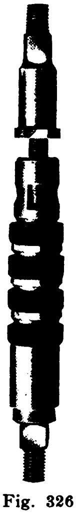


Fig. 326

Inside diameter of barrel.......inches	1¾	2¼	2¾
Price complete ....each	$9.00	$14.50	$25.00

CROCKER CHECK VALVE WITH ROD

Fig. 327

Crocker Check Valves

To hold up the column of fluid and prevent its pounding down on the valves when the working barrel is filled partly with oil and partly with gas.

Inside diameter of barrel............inches	1¾	2¼	2¾	3¼	3¾
Valve, complete with rod and connections ....each	$7.25	$12.00	$18.50	$22.00	$28.75
Valve only .... "	6.00	10.00	15.50	17.00	23.00
Steel check .... "	.60	1.50	2.00	2.50	3.25
Brass check .... "	.75	.....	.....	.....	.....
Crown .... "	1.00	2.00	2.75	3.25	3.75
Upper connection, iron............. "	.50	.65	.75	1.25	1.50
Lower connection, iron............. "	.50	.65	.75	1.25	1.50
Upper connection, brass............ "	.75	.....	.....	.....	.....
Lower connection, brass............ "	.75	.....	.....	.....	.....
Iron rod .... "	.50	1.00	2.00	3.00	3.50
Steel seat .... "	.50	.....	.....	.....	.....

Steam and Power

Pumping Machinery

For All Purposes

Pages 132 to 192 Inclusive

General Remarks and Guarantee

It is our aim to build pumps which will be economical in operation and durable in service.

All parts are made to gauge and therefore interchangeable.

All material used is the best obtainable, and the workmanship of guaranteed excellence.

Every machine, after being thoroughly inspected and tested at the factory under various speeds and pressures, is painted, the bright work covered with a rust-proof coating, the interior of the steam end thoroughly oiled, and water piston packing removed, dried and replaced.

All fittings such as wrenches, drain valves, etc., are boxed and securely attached to the pump, no extra charge being made for preparing the pumps for shipment in this manner.

An extra charge is made for boxing for export shipment or when a pump must be specially "knocked down."

Packing for stuffing boxes, foundation bolts and nuts, throttle valves, governors, gauges, piping, etc., are not furnished unless at an extra cost. They will be supplied at market prices when ordered.

Regular construction of all Piston Pattern and Plunger and Ring Pattern Pumps (except Underwriter Fire Pumps) listed on the following pages, includes steel piston rods and iron piston rod stuffing boxes.

The pumps will be brass fitted when so ordered at a slight additional cost.

"Plunger and Ring" Pattern pumps, both steam and power pumps, are regularly fitted with packed pistons as per sketch Fig. 331, page 135, unless otherwise ordered:

Air chambers are not supplied regularly with the following sizes of pumps, as the nature of the work to which the pumps are usually put is such that an air chamber is of no benefit whatever. For situations where air chambers are needed they can be furnished at slight extra cost.

Duplex Piston Pattern, up to and including 8x6x12..
Duplex Center Packed Plunger Pattern, up to and including 8x6x12.
Duplex Piston Pattern Power Pump, up to and including 6x10.
Duplex Valve Pot Pumps, all sizes.
Duplex Ram Pattern Pumps, all sizes.

For the larger sizes, with which air chambers are regularly furnished, the same are made of close-grained cast iron.

Copper air chambers will be furnished, if desired, at an extra cost.

In any line of machinery containing such a diversity of sizes and styles, of which the larger machines must of necessity be modified somewhat in design from the smaller sizes, it is almost impossible to refer in a catalogue to every slight difference in these details of design. Hence, it will be advantageous for our customers to obtain from us specific information concerning the particular pump they may have under consideration.

The pipe sizes and dimensions given in the catalogue are subject to change whenever it may be necessary for us to do so. Hence, a blue print should be obtained for every pump ordered, which will give correctly the pipe sizes, and other information needed to properly install the pump.

We guarantee all of our pumps to be made of first-class material and in a workmanlike manner and that they will, when properly installed, perform the work for which they were designed. If it is shown that any part proves defective within one year from installation, due to any fault in material or workmanship, we will furnish a new part to replace it without charge.

Directions for Setting Up and Running Pumps

Never use pipes of smaller size than given in the tables. When long pipes are used, it is necessary to increase the size to allow for the increased friction. Especially must this be observed in suction pipes.

Use as few elbows, T's and valves as possible, as they greatly increase friction. Use full round bends rather than elbows.

Care should be taken to guard against leaks in the suction pipe, as a very small leak destroys the effectiveness of the suction of a pump.

If the suction lift is high or the suction pipe long, a priming connection will be necessary. Also in such cases a vacuum chamber should always be used, as it is of the greatest importance in securing smoothness of operation.

Where the suction lift is high, a foot valve insures quick starting of the pump by maintaining the suction pipe full of water. This is very essential with power pumps.

When hot water is to be pumped, place the pump below the source of supply so the water will flow to the pump. Hot water cannot well be lifted by suction, as its vapors tend to destroy the necessary vacuum.

A pump used for handling hot water should be fitted with hard rubber or brass valves.

Lay suction pipes with a uniform grade from the pump to the source of supply, and be sure to avoid air pockets.

It often happens that a pump refuses to lift water while the full pressure against which it is expected to work is resting on the discharge valves, for the reason that the air in the pump cylinders is not discharged, but only compressed by the motion of the pistons. It is preferable to arrange for running without pressure until the air is expelled from the pump and suction pipe. This is done by placing a swing check valve in the discharge pipe near the pump and opening the air vent which is provided on the discharge elbow or in the bonnet of the pump.

Keep the stuffing boxes evenly filled with packing, but do not screw them too tight.

Frequently a piston pattern pump fails to start properly due to piston packing swelling, especially if the pump is handling hot water. In such cases pistons must be carefully repacked and ample room left to allow for expansion of packing.

Give a pump reasonable attention if you expect satisfactory service.

Repairs

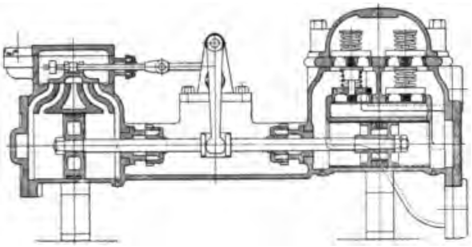
In ordering parts for pumps, be sure to give the **Shop Number,** as well as the size of the pump.

In stating the size of pump desired, mention first, the diameter of the steam cylinders; next, the diameter of the water cylinders, and then the length of stroke.

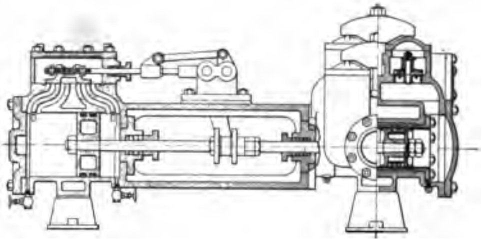
The shop number, or factory serial number, will be found stamped on a brass plate attached to the water box. In case this plate becomes lost, the shop number may be found stamped on the upper portion of the steam cylinder flange, and in case of power pumps, on the water box flange.

Write us for a repair part chart to assist in ordering repairs, in case the one sent with the pump becomes lost.

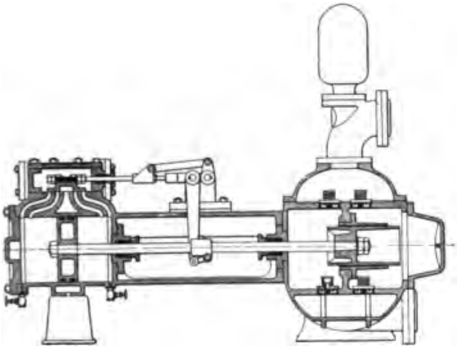
Duplex Pumps



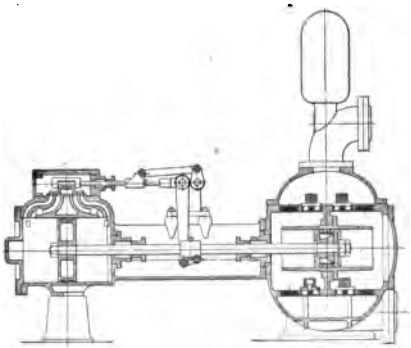
Duplex Piston Pattern Boiler Feed and General Service Pump.
Fig. 328



Special Duplex Piston Pattern Pump.
Fig. 329

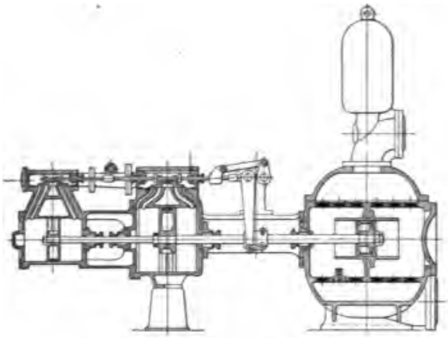


Duplex Plunger and Ring Pattern Pump.
Fig. 330

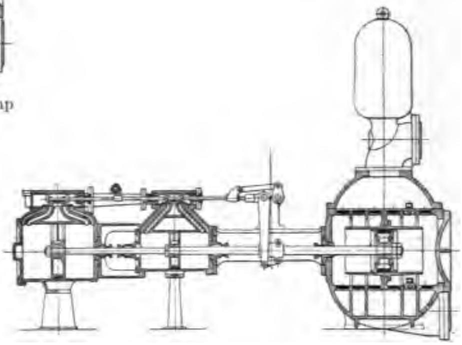


Same design as Fig. 330 except fitted with packed pistons.
Fig. 331

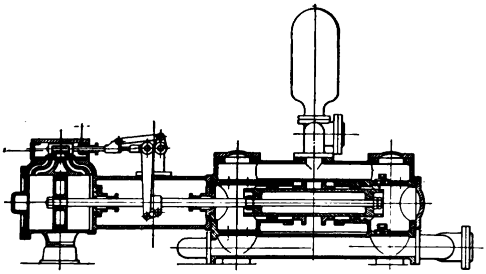
Duplex Pumps



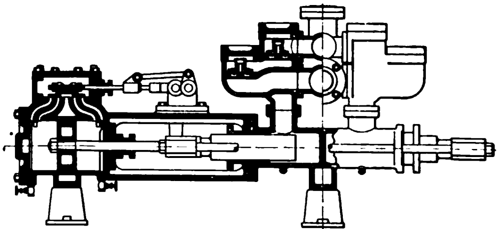
Compound Duplex Plunger and Ring Pattern Pump fitted with packed water piston and No. 1 steam end.
Fig. 332



Compound Duplex Plunger and Ring Pattern Pump fitted with packed pistons and No. 2 style steam end.
Fig. 333



Duplex Center Packed Plunger Pump—size 12x7x12.
Fig. 334



Duplex Valve Pot Pump—size 10x6x10.
Fig. 335

Duplex Pumps

The illustrations on pages 135 and 136 show sectional views through a few of those types of pumps we manufacture for which there is the greatest demand.

The machines shown are all of the duplex pattern, and the steam mechanism is so well known as to require but a word of mention.

These duplex pumps consist practically of two pumps placed side by side and so arranged that the steam valve of one side receives its motion from the main piston of the opposite side. This construction is very simple and makes it impossible for the pump ever to stop on a dead center.

As we use flat slide steam valves, carefully fitted to the cylinder faces, we can guarantee that our pumps will be found positive and durable under all conditions of service.

Fig. 328 shows sectional view through our packed piston pattern boiler feed and general service pumps. In this design the water pistons are "submerged" and the water valves are all located above the pistons.

Fig. 329 shows a special design of duplex piston pattern pump, full description of which will be found elsewhere.

Figs. 330 and 331 show type of pump which we refer to as our plunger and ring design. In this design the suction valves are arranged beneath the plungers or pistons, and the discharge valves above same, thus giving very direct passages for the liquid through the pumps, which may be operated at high piston speeds without excessive shock or jar. For situations where the water is clear, such as water works, hydraulic elevator service, etc., these pumps give excellent satisfaction.

Unless pumps of the foregoing type are ordered fitted with solid plungers and rings, it is our practice to furnish the machines with packed pistons, as shown by Fig. 331.

Figs. 332 and 333 are used to illustrate more particularly the difference in design between our No. 1 and No. 2 style compound duplex steam ends.

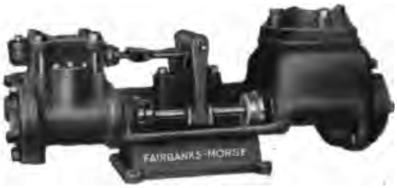
Figs. 334 and 335 show two types of outside packed plunger pumps, the first being a center packed design and the second showing end packed design, with valves arranged in separate pots. These types and modifications of same are recommended for high pressure boiler feeding and for other situations where the pressure is heavy and the service severe, such as mine work and the operation of hydraulic machinery of various kinds.

We invite correspondence concerning details of design with a view to making the best possible selection of machinery to meet each given case. If we are given such an opportunity of submitting these questions to our Engineering Department we are thus enabled to serve to the best possible advantage the interest of our customer.

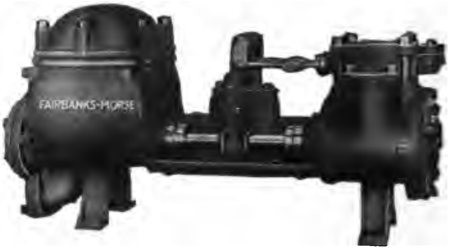
Note 1—*It is evident that considerable judgment must be exercised in determining the proper size of pump to use for a given work and the question of speed, pressure, the number of hours per day the pump is to operate, etc., must all be carefully considered when making the selection.*

Note 2—*An examination of our catalogue will show that we have rated our pumps on a very conservative basis, although any of the machines can be operated under suitable conditions at from 25 to 50 per cent faster than the ratings given.*

Duplex Piston Pattern Boiler Feed Pumps

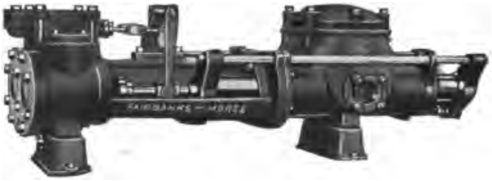


Illustrating size 3x2x4.
Fig. 336

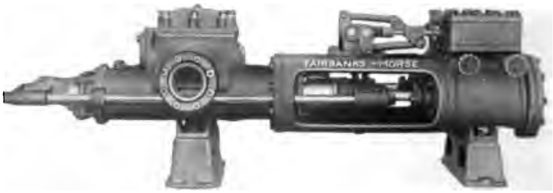


Illustrating sizes 4½x3x4 to 6x4x6 inclusive.
Fig. 337

Duplex Ram Pattern Pumps



Illustrating 7½x4½x10 and smaller sizes.
Fig. 338



Illustrating 10x6x10 and 12x7x10 sizes.
Fig. 339

Duplex Piston Pattern Boiler Feed Pumps

FOR BOILER PRESSURES NOT EXCEEDING 150 LBS.

While nearly all the regular pattern pumps listed on page 143 may be used for boiler feeding, yet the following sizes are selected as being perhaps the best proportioned for that particular service when pumping clean water.

The general design of these pumps is shown in section by Fig. 328, page 135.

These pumps are fitted with either brass or rubber valves, as desired. When pumping cold water, soft or medium rubber valves are preferable, but when pumping hot water the valves should be of hard rubber, or brass.

The ratings given below are very conservative, but while the pumps can be speeded up to a greater capacity, it is evident that if pumps are selected on the lower rating it means increased life to the pump and a decrease in cost for maintenance. See Notes 1 and 2, page 137.

Where the boiler pressure exceeds 150 lbs. per square inch we recommend the use of our outside packed plunger pumps.

Diameter of Steam Cylinder, Inches	Diameter of Water Cylinder, Inches	Length of Stroke, Inches	Capacity in Gallons perStroke of One Piston	H. P. of Boilers Pump will Supply at an Easy Speed	Diameter of Pipe For Short Lengths, Inches				Floor Space, Inches	Telegraphic Code Word
					Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe		
3	2	4	.05	75	3/8	½	1¼	1	30x11	Pabal
4½	3	4	.12	150	½	¾	2	1½	35x13	Pabek
5¼	3½	5	.20	300	1	1¼	2½	1½	39x16	Pabla
6	4	6	.33	450	1	1½	3	2	45x17	Pabre
* 7	4½	7	.48	550	1½	2	4	3	52x20	Pabox
* 7	5	7	.59	650	1½	2	4	3	52x20	Pabmo
* 7	4½	10	.69	750	1½	2	4	3	68x22	Pabon
* 7	5	10	.85	900	1½	2	4	3	68x22	Pabxy
† 8	5	12	1.02	1000	1½	2	4	3	72x23	Pabst
††10	6	12	1.47	1400	2	2½	5	4	72x28	Pabul

*Sizes 7x4½x7 to 7x5x10, inclusive, are similar in appearance to Fig. 344, on page 142.
†Size 8x5x12 is similar in appearance to Fig. 345, on page 142.
††Size 10x6x12 is similar in appearance to Fig. 346, on page 142.
Size 10x6x12 is provided with air chamber. Other sizes listed above are not regularly so fitted.

Duplex Ram Pattern Pumps

FOR DISCHARGE PRESSURES NOT EXCEEDING 175 LBS.

In this type of pump the plungers being outside (i. e., externally) packed, are always in sight of the attendant engineer, and the stuffing box packing is easily adjusted, or replaced when necessary, without having to break joints or remove cylinder covers.

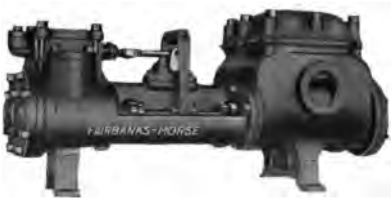
The element of slippage is reduced to a minimum in this type, and the volumetric efficiency is correspondingly increased.

These pumps are adapted for handling water at a high temperature, or water containing sand or grit, and for high pressure boiler feeding they offer many advantages.

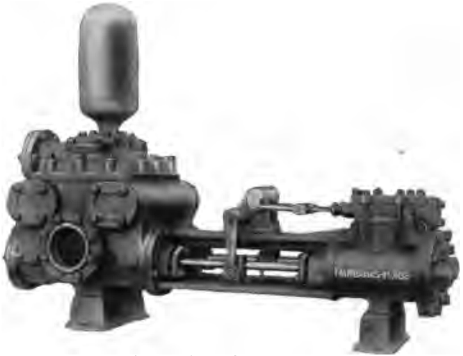
Diameter of Steam Cylinder, Inches	Diameter of Water Cylinder, Inches	Length of Stroke, Inches	Capacity in Gallons perStroke of One Piston	H. P. of Boilers Pump will Supply at an Easy Speed	Diameter of Pipe For Short Lengths, Inches				Floor Space, Inches	Telegraphic Code Word
					Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe		
4½	3	4	.12	150	½	¾	2	1½	56x16	Pacat
5¼	3½	5	.20	300	1	1¼	2½	1½	64x18	Padog
6	4	6	.33	450	1	1½	3	2	70x19	Palak
7½	5	6	.49	650	1½	2	4	3	71x23	Pakal
7½	4½	10	.69	750	1½	2	4	3	98x29	Pakod
10	6	10	1.22	1200	2	2½	5	4	102x34	Pamud
12	7	10	1.66	1700	2½	3	6	5	108x37	Pamex

Any of the above pumps can be furnished brass fitted at a slight additional expense.

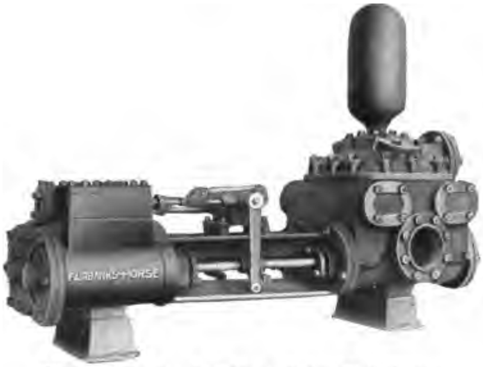
Duplex Piston Pattern Low Service or Tank Pumps



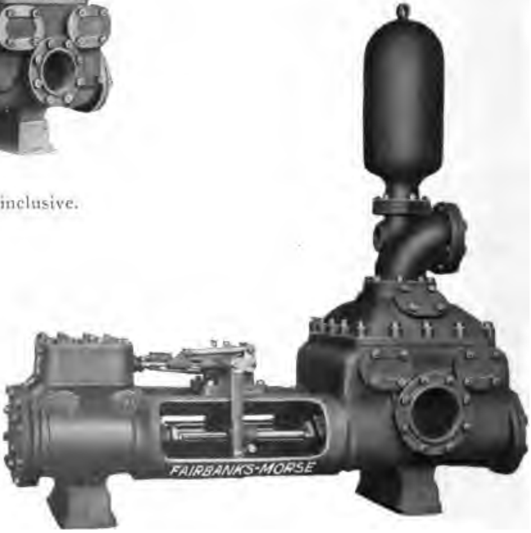
Illustrating 6x5¾x6 and smaller sizes.
Fig. 340



Illustrating size 7x7x10.
Fig. 341



Illustrating size 8x7x12 to 8x10x12 inclusive.
Fig. 342



Illustrating 10x10x12 and Larger Sizes.
Fig. 343

Duplex Piston Pattern Low Service or Tank Pumps

Our piston pattern pumps of this type have water ends of the general design shown by Fig. 328, on page 135. These pumps are especially designed for elevating water, or other liquids, to a moderate height with a small consumption of steam.

For work where the head to be pumped against is not too high, they are, by reason of their cylinder proportions, more economical in consumption of steam than our general service pumps.

They have water pistons nearly or quite the diameter of their steam pistons, therefore cannot feed their own boilers; but when it is desired an auxiliary boiler feed pump may be attached for this purpose at a small expense.

They are designed for use in connection with railway water stations, breweries, distilleries, gas works, tanneries, oil works, bleachers, sugar refineries, etc.

They are designed for water pressures not exceeding 75 pounds per square inch.

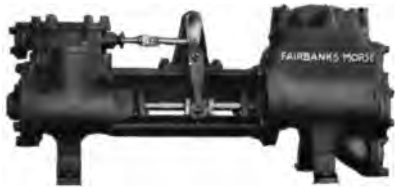
Diameter of Steam Cylinders, Inches	Diameter of Water Cylinders, Inches	Length of Stroke, Inches	Gallons per Stroke of One Piston	Piston Travel, in feet, per Minute Conservative Rating	Gallons per Minute at Rated Speed	Pipe Sizes for Short Lengths, Inches				Floor Space, Inches	Telegraphic Code Word
						Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe		
3	2½	4	.06	35	17.8	⅜	½	1¼	1	28x11½	Para
* 4½	3¾	4	.19	35	41	½	¾	2½	2	36x13½	Pamab
5¼	4¼	5	.31	40	58	1	1¼	3	2	38½x16	Pamek
5¼	5	5	.42	40	81	1	1¼	4	3	39x16	Pamox
* 5¼	5¾	5	.56	40	107	1	1¼	4	3	42x18	Paneb
6	5	6	.51	45	92	1	1½	4	3	45x17	Panha
* 6	5¾	6	.67	45	120	1	1½	4	3	46x18	Panij
* 6	8½	6	1.48	45	264	1	1½	6	5	54x24	Panlo
* 7	6	7	.85	55	160	1½	2	5	4	57x19	Panra
* 7	7	7	1.16	55	220	1½	2	6	5	58x24½	Panse
7	6	10	1.22	70	205	1½	2	5	4	67x22	Pantx
* 7	7	10	1.66	70	280	1½	2	6	5	72x26	Panya
8	6	12	1.47	80	233	1½	2	5	4	72x23	Papab
* 8	7	12	2.00	80	320	1½	2	6	5	75x26	Papba
* 8	8½	12	2.94	80	472	1½	2	6	5	76x27	Papef
* 8	10	12	4.08	80	652	1½	2	8	7	82x33	Papfe
*10	10	12	4.08	80	652	2	2½	8	7	85x33	Papgi
*12	10	12	4.08	80	652	2½	3	8	7	85x37	Papha
*10	14	18	12.00	100	1600	2	2½	12	10	110x45	Papig
*12	14	18	12.00	100	1600	2½	3	12	10	110x45	Papko
*14	14	18	12.00	100	1600	2½	3	12	10	112x45	Papok
*12	18	18	19.83	100	2644	2½	3	16	14	112x55	Papra
*14	18	18	19.83	100	2644	2½	3	16	14	112x55	Papse
*16	18	18	19.83	100	2644	2½	3	16	14	114x55	Paptu
*18	18	18	19.83	100	2644	3	3½	16	14	116x55	Paput

*These sizes have suction opening on the side. All other sizes have suction opening on the end.

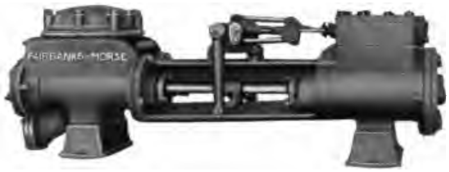
Any of the above sizes will be furnished brass fitted at a slight additional cost.

See Notes 1 and 2, page 137, concerning capacities.

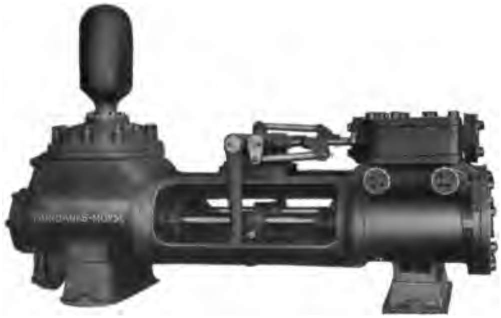
Duplex Piston Pattern Pumps for General Service



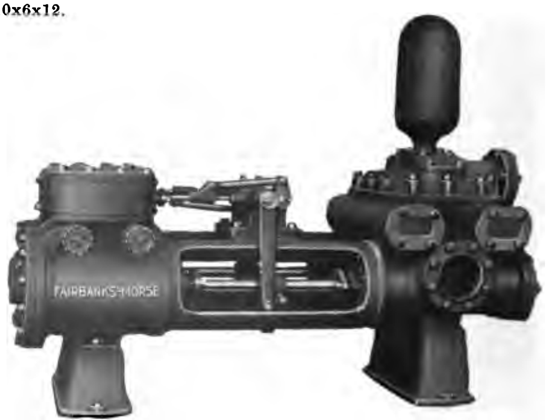
Illustrating General Design of 7x4½x7 to 7x5x10, inclusive.
Fig. 344



Illustrating General Design of 8x5x12.
Fig. 345



Illustrating General Design of 10x6x12.
Fig. 346



Illustrating General Design of 12x7x12 and Larger Sizes.
Fig. 347

Duplex Piston Pattern Pumps for General Service

The cuts on the opposite page illustrate Fairbanks-Morse Piston Pattern Pumps for general service. They are designed for water pressures not exceeding 150 pounds per square inch.

The water ends are similar in general design to pump shown in section by Fig. 328, on page 135.

The stuffing boxes are all of ample depth, and all parts of the machines easily accessible for examination or repairs.

Diameter of Steam Cylinders, Inches	Diameter of Water Cylinders, Inches	Length of Stroke, Inches	Capacity in Gallons per Stroke of One Piston	Piston Travel, in feet, per Minute Conservative Rating	Gallons per Minute at Rated Speed	Pipe Sizes for Short Lengths, Inches				Floor Space, Inches	Telegraphic Code Word
						Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe		
3	2	4	.05	35	11	⅜	½	1¼	1	30x11	Parab
4½	3	4	.12	35	25	½	¾	2	1½	35x13	Parba
5¼	3½	5	.20	40	40	1	1¼	2½	1½	39x16	Parce
6	4	6	.33	45	58	1	1½	3	2	45x17	Parck
7	4½	7	.48	55	91	1½	2	4	3	52x20	Parky
7	5	7	.59	55	112	1½	2	4	3	52x20	Pared
7	4½	10	.69	70	116	1½	2	4	3	68x22	Parfe
7	5	10	.85	70	142	1½	2	4	3	68x22	Pargh

Size 3x2x4 is similar in appearance to Fig. 336, page 138.
Sizes 4½x3x4 to 6x4x6, inclusive, are similar in general design to Fig. 337, page 138.
Sizes 7x4½x7 to 7x5x10, inclusive, are similar in general design to Fig. 344, page 142.
See Notes 1 and 2, page 137, concerning capacities.

In the following sizes Fairbanks-Morse pumps are made with style of steam valve mechanism as shown by Figs. 345 and 346 on opposite page.

Aside from this feature the details of design are practically the same as in the smaller sizes mentioned above.

They will stand a constant water pressure not exceeding 150 pounds.

Diameter of Steam Cylinders, Inches	Diameter of Water Cylinders, Inches	Length of Stroke, Inches	Capacity in Gallons per Stroke of One Piston	Piston Travel, in feet, per Minute Conservative Rating	Gallons per Minute at Rated Speed	Pipe Sizes for Short Lengths, Inches				Floor Space, Inches	Telegraphic Code Word
						Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe		
8	4	12	.66	80	106	1½	2	4	3	72x23	Parhg
8	5	12	1.02	80	163	1½	2	4	3	72x23	Parig
10	5	12	1.02	80	163	1½	2	5	4	74x28	Parjo
10	6	12	1.47	80	235	2	2½	5	4	74x28	Parkn
10	7	12	2.00	80	320	2	2½	6	5	76x28	Parlk
12	7	12	2.00	80	320	2½	3	6	5	78x31	Parma
14	7	12	2.00	80	320	2½	3	6	5	80x38½	Parne
10	8½	12	2.94	80	470	2½	2½	7	6	80x32	Parno
12	8½	12	2.94	80	470	2½	3	7	6	80x32	Paron
14	8½	12	2.94	80	470	2½	3	7	6	80x38½	Parps
16	8½	12	2.94	80	470	2½	3	7	6	90x41	Parqr
14	10	12	4.08	80	652	2½	3	8	7	85x38½	Parst
16	10	12	4.08	80	652	2½	3	8	7	90x41	Parus

Any of the above pumps will be furnished brass fitted at a slight additional cost.
10x6x12 and larger sizes are fitted regularly with air chambers.
Smaller sizes are not so fitted.
See Notes 1 and 2, page 137, concerning capacities.

Compound Duplex Piston Pattern Pumps
For General Service

Pumps listed below have water ends of the submerged piston type of the same general design as the simple duplex piston pump, pages 141 and 143.

FOR 150 POUNDS WATER PRESSURE

SIZE	Capacity Gallons per Stroke One Piston	Piston Travel Feet per Minute Conservative Rating	Gallons per Minute at Rated Speed	Pipe Sizes for Short Lengths, Inches				Floor Space in Inches	Telegraphic Code Word
				Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe		
6 & 10x 6 x12	1.46	80	235	1	2½	5	4	101x25	Pib
8 & 12x 7 x12	2.00	80	320	1½	3	6	5	107x32	Pibab
9 & 14x 7 x12	2.00	80	320	2	3	6	5	111x38	Pasab
8 & 12x 8½x12	2.94	80	470	1½	3	7	6	106x32	Pasba
9 & 14x 8½x12	2.94	80	470	2	3	7	6	113x38	Pasce
10 & 16x 8½x12	2.94	80	470	2	3	7	6	120x41	Pasda
10 & 16x10 x12	4.08	80	652	2	3	8	7	122x41	Pased

For Low Service

FOR 75 POUNDS WATER PRESSURE

SIZE	Capacity Gallons per Stroke One Piston	Piston Travel Feet per Minute Conservative Rating	Gallons per Minute at Rated Speed	Pipe Sizes for Short Lengths, Inches				Floor Space in Inches	Telegraphic Code Word
				Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe		
6 & 10x 7 x12	2.00	80	320	1	1½	6	5	104x28	Pasfa
6 & 10x 8½x12	2.94	80	470	1	1½	7	6	108x32	Pasgo
8 & 12x10 x12	4.08	80	652	1½	3	8	7	115x33	Pashi
9 & 14x10 x12	4.08	80	652	2	3	8	7	119x38	Pasja

Any of these pumps can be furnished brass fitted at a slight additional cost.
See Notes 1 and 2, page 137, concerning capacities.

Vertical Duplex Piston Pattern Pumps
Marine Type

FOR BOILER FEEDING AND GENERAL SERVICE
FOR 200 POUNDS WORKING PRESSURE

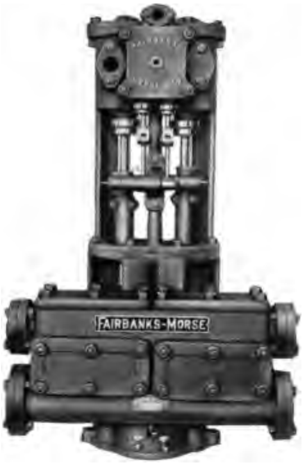


Fig. 348—Size 6x4x6.

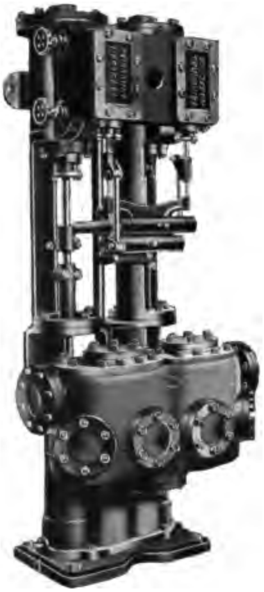


Fig. 349—Size 10x6x12.

The type of pump illustrated above is of a form designed primarily for any situation where a restricted floor space makes a vertical form of pump preferable, such as marine service, for office buildings, etc.

Every part of the pump is easy of access, and the water passages are very free and direct. The interior of the pump chambers may be easily reached through conveniently arranged hand holes. The water pistons may be packed through the top of the water boxes and without having to disturb either the steam pistons or any part of the valve motion.

These pumps are designed for water pressure up to 200 pounds per square inch.

Diameter of Steam Cylinders, Inches	Diameter of Water Cylinders, Inches	Length of Stroke, Inches	Gallons per Stroke of one Piston	Gallons per Minute at Easy Speed	Diameter of Pipe for Short Lengths, Inches				Telegraphic Code Word
					Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe	
4½	3	4	.12	25	½	¾	2	1½	Petka
5¼	3½	5	.20	40	1	1¼	2½	1½	Petad
6	4	6	.33	58	1	1½	3	2	Petab
7½	5	6	.49	91	1½	2	4	3	Petda
7	4½	10	.69	116	1½	2	4	3	Petog
8	5	12	1.02	163	1½	2	4	3	Petef
10	6	12	1.47	235	2	2½	5	4	Petgh
10	7	12	2.00	320	2	2½	6	5	Petil

Duplex Plunger and Ring Pattern Pumps

For General Service

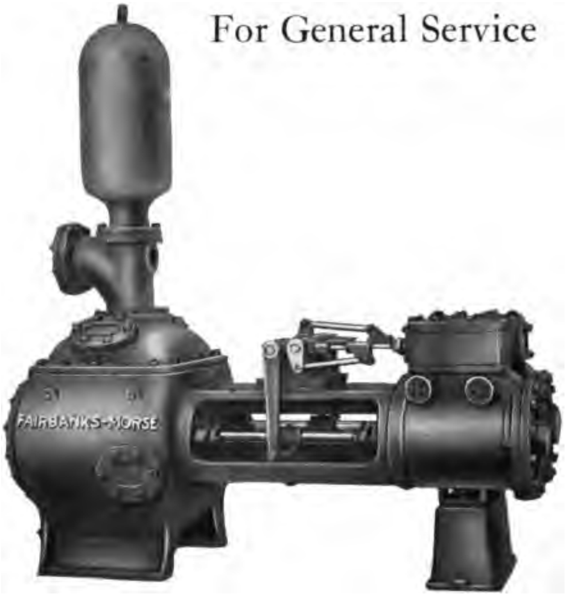


Fig. 350—Illustrating 12-inch stroke sizes.

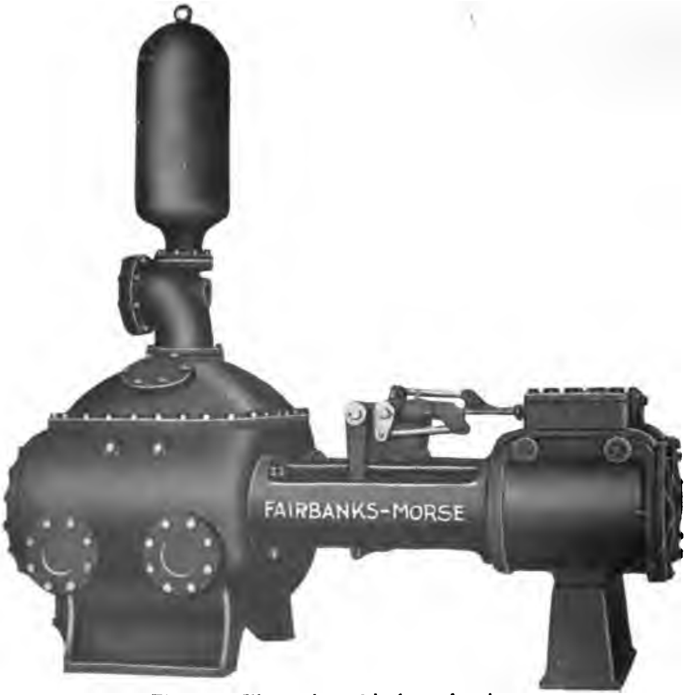


Fig. 351—Illustrating 18-inch stroke sizes.

Duplex Plunger and Ring Pattern Pumps For General Service

The following list of pumps is shown in section by Figs. 330 and 331, page 135.

Valve areas are large and the passages direct.

We commonly fit these pumps with packed pistons but can fit them with solid plungers when necessary, or when the service makes such construction desirable.

These pumps are used very largely by Railroad Companies for water station service, small water works, and for general service where the discharge pressure does not exceed 150 pounds per square inch.

Diameter of Steam Cylinders, Inches	Diameter of Water Cylinders, Inches	Length of Stroke, Inches	Capacity in Gallons per Stroke of One Plunger	Piston Travel, in feet, per Minute Conservative Rating	Gallons per Minute at Rated Speed	Pipe Sizes for Short Lengths, Inches				Floor Space, Inches	Telegraphic Code Word
						Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe		
10	6	12	1.47	80	235	2	2½	5	4	80x32	Paske
12	6	12	1.47	80	235	2½	3	5	4	80x32	Paslk
10	7	12	2.00	80	320	2	2½	6	5	80x33	Pasmo
12	7	12	2.00	80	320	2½	3	6	5	80x33	Pasne
14	7	12	2.00	80	320	2½	3	6	5	80x42	Pason
12	8	12	2.61	80	417	2½	3	6	5	80x35	Palfo
14	8	12	2.61	80	417	2½	3	6	5	80x42	Paspa
16	8	12	2.61	80	417	2½	3	6	5	80x42	Pasqe
12	8½	12	2.94	80	470	2½	3	6	5	80x42	Pasrt
14	8½	12	2.94	80	470	2½	3	7	6	80x42	Passo
16	8½	12	2.94	80	470	2½	3	7	6	87x42	Pasty
14	9	12	3.30	80	530	2½	3	7	6	80x42	Pasye
16	9	12	3.30	80	530	2½	3	7	6	87x42	Pasz
18	9	12	3.30	80	530	3	3½	8	7	90x48	Pabab
16	10	12	4.08	80	652	2½	3	8	7	87x48	Patba
18	10	12	4.08	80	652	3	3½	8	7	90x48	Pamba
16	12	12	5.87	80	940	3	3½	10	8	98x47	Patdo
18	12	12	5.87	80	940	3	3½	10	8	98x47	Pated
16	9	18	4.95	100	660	2½	3	7	6	104x50	Patfg
18	9	18	4.95	100	660	2½	3	7	6	106x50	Patgf
16	10	18	6.12	100	816	2½	3	8	7	104x50	Pathi
18	10	18	6.12	100	816	3	3½	8	7	106x50	Patih
20	10	18	6.12	100	816	4	5	10	7	106x50	Patjk
16	12	18	8.81	100	1174	2½	3	10	8	104x47	Patka
18	12	18	8.81	100	1174	3	3½	10	8	106x53	Patlo
20	12	18	8.81	100	1174	4	5	10	8	111x56	Patma
18	14	18	12.00	100	1600	3	3½	12	10	105x58	Patno
20	14	18	12.00	100	1600	4	5	12	10	112x56	Patpa
18	16	18	15.67	100	2088	3	3½	14	12	126x68	Patre
20	16	18	15.67	100	2088	4	5	14	12	127½x68	Patsa

Any of the above pumps can be furnished brass fitted at a slight additional cost.

See Notes 1 and 2, page 137, concerning capacities.

Duplex Plunger and Ring Pattern Low Service or Tank Pumps

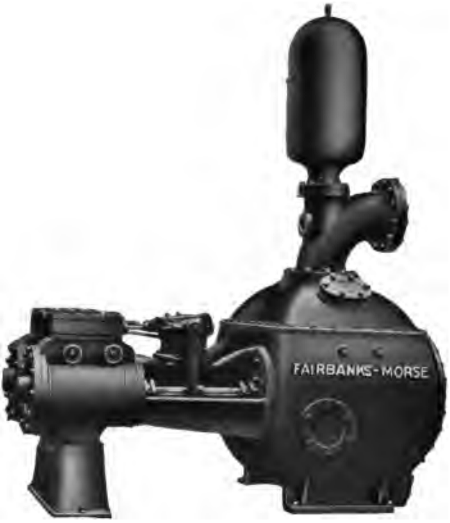


Fig. 352—Size 14x14x12.

The design of the water end is shown in section by Figs. 330 and 331, page 135.

These pumps are designed for water pressures not exceeding 75 pounds per square inch.

Size of Pump			Gallons per Stroke of One Piston	Piston Travel, in feet, per Minute Conservative Rating	Gallons per Minute at Rated Speed	Diameter of Pipes for Short Lengths, Inches				Floor Space, Inches	Telegraphic Code Word
Diameter of Steam Cylinders, Inches	Diameter of Water Cylinders, Inches	Length of Stroke, Inches				Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe		
8	7	12	2.00	80	320	1½	2	6	5	74x35	Parda
8	8	12	2.61	80	417	1½	2	6	5	74x35	Pavab
10	8	12	2.61	80	417	2	2½	6	5	74x35	Pavba
8	10	12	4.08	80	652	1½	2	8	7	82x43	Pavca
10	10	12	4.08	80	652	2	2½	8	7	82x43½	Pavde
12	10	12	4.08	80	652	2½	3	8	7	82x43½	Paved
14	10	12	4.08	80	652	2½	3	8	7	82x43½	Pavef
10	12	12	5.87	80	940	2	2½	10	8	92x47	Pavfe
12	12	12	5.87	80	940	2½	3	10	8	92x47	Pavfg
14	12	12	5.87	80	940	2½	3	10	8	92x47	Pavgf
10	14	12	7.99	80	1280	2	2½	12	10	92x49	Pavfh
12	14	12	7.99	80	1280	2½	3	12	10	92x49	Pavgi
14	14	12	7.99	80	1280	2½	3	12	10	92x49	Pavho
16	14	12	7.99	80	1280	2½	3	12	10	96x58	Pavix
12	14	18	12.00	100	1600	2½	3	12	10	107x58	Pavka
14	14	18	12.00	100	1600	2½	3	12	10	107x58	Pavlk
16	14	18	12.00	100	1600	2½	3	12	10	107x58	Pavmo
12	15	18	13.77	100	1836	2½	3	12	10	107x58	Pavme
12	16	18	15.67	100	2088	2½	3	14	12	125x70	Pavny
14	16	18	15.67	100	2088	2½	3	14	12	125x70	Pavpr
16	16	18	15.67	100	2088	2½	3	14	12	125x70	Pavgx

Any of the above pumps will be furnished brass fitted at a slight additional cost.

See Notes 1 and 2, page 137, concerning capacities.

Duplex Low Steam Pressure Pumps

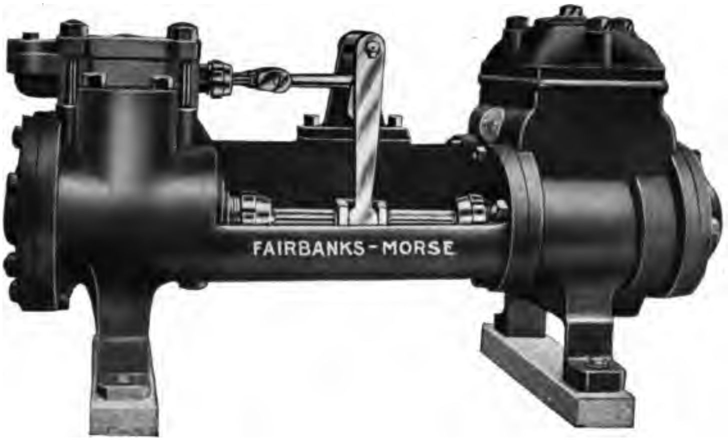


Fig. 353—Size 6x2½x6.

In apartment houses, halls, and public buildings, and in private residences, where a low pressure heating system is used, only a very moderate pressure of steam is available to operate the pumps. Therefore the relative proportions of steam and water cylinders must differ from those in a pump operated under a higher steam pressure. We furnish our special low steam pressure pumps for such service. They are smooth and noiseless in their action and consequently best adapted for such buildings. They will operate with a steam pressure of from 10 to 15 pounds.

Size of Pump			Capacity in Gallons per Hour at Easy Speed	Diameter of Pipes for Short Lengths, Inches				Floor Space, Inches	Telegraphic Code Word
Diameter of Steam Cylinders, Inches	Diameter of Water Cylinders, Inches	Length of Stroke, Inches		Steam Pipe	Ex-haust Pipe	Suc-tion Pipe	Dis-charge Pipe		
3	1½	4	125 to 200	⅜	½	1¼	1	28 x11½	Pate
4½	2	4	200 to 300	½	¾	2	1½	33½x14	Paxab
4½	2¼	4	250 to 375	½	¾	2	1½	33½x14	Paxba
5¼	2	5	350 to 450	1	1¼	2½	1½	37½x16	Paxdo
5¼	2½	5	450 to 650	1	1¼	2½	1½	37½x16	Paxde
6	2½	6	700 to 1000	1	1½	2½	1½	41 x17	Paxey
6	3	6	900 to 1200	1	1½	2½	1½	41 x17	Paxgr
7	3½	10	1800 to'2400	1½	2	4	3	68 x23	Paxhi
*8	3½	12	2000 to 3000	1½	2	4	3	71 x23	Paxih
*8	4	12	2500 to 3800	1½	2	4	3	71 x23	Patent

Any of the above pumps will be furnished brass fitted at a slight additional cost.

*These two sizes have style of steam valve mechanism snown by Fig. 345, page 142.

Duplex Automatic Feed Pumps and Receivers

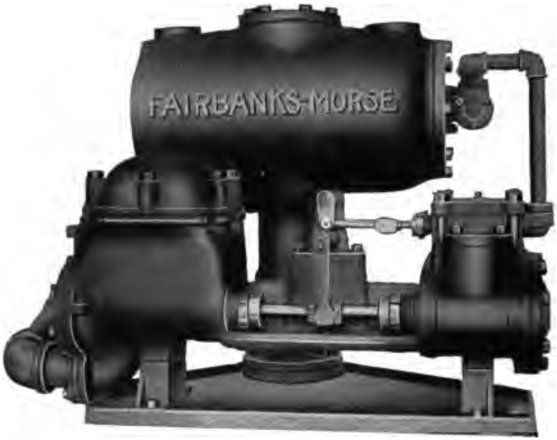


Fig. 354—Size 6x4x6—Illustrating Duplex Piston Pattern Pump and Receiver.

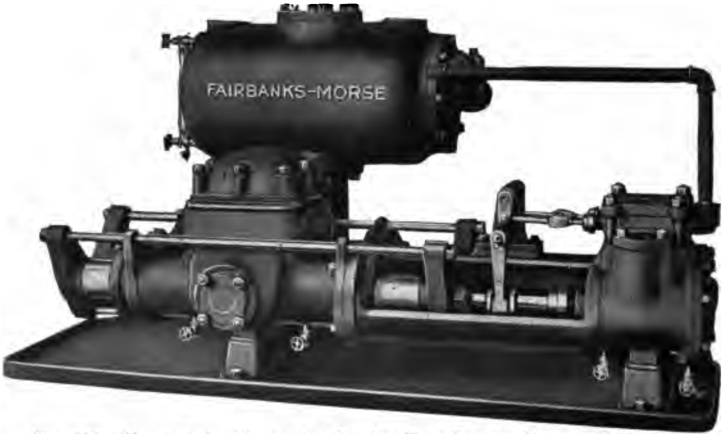


Fig. 355—Size 6x4x6—Illustrating Duplex Ram Pattern Pump and Receiver.

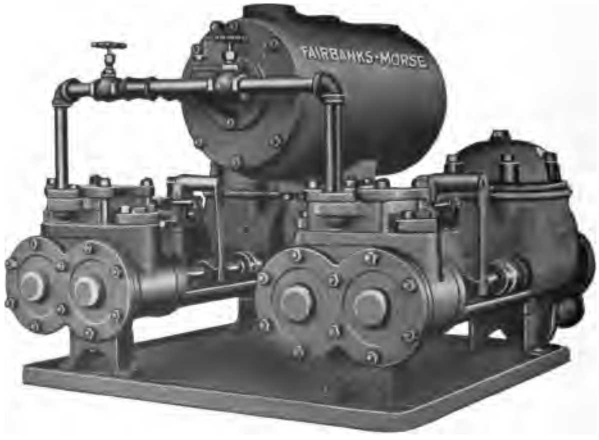


Fig. 356—Illustrating an arrangement of Two Pumps connected to one Automatic Receiving Tank so that One Pump can be operated and the other held in reserve.

Duplex Automatic Feed Pumps and Receivers

This is a simple and effective combination of our duplex steam pump attached to a receiving tank, which receives the water of condensation and the pump automatically returns it to the boiler at the highest possible temperature.

These machines are especially useful for returning water of condensation from steam heating coils, drying cylinders, evaporating effects or in any place where it is desirable to return such condensation to the boiler at as high a temperature as possible.

By the use of feed pumps and receivers such annoyances as are experienced with steam traps, tanks and similar devices are entirely obviated.

The tanks used with our Pumps and Receivers are made strong enough to stand a pressure of 100 lbs. per square inch, but if the tank is liable to be subjected to a pressure in excess of 25 lbs. per square inch owing to the arrangement of the heating system with which the machine is used, then we recommend the use of an automatic relief valve, same to be placed preferably on the receiving tank. We can furnish this relief valve, if specially ordered, at extra cost.

No.	Size of Pump, Inches	Size of Receiver, Inches	Capacity per Minute, Gallons	Square Feet of Heating Surface it Will Drain	Floor Space, Inches	Height, Inches	No. of Inlets	Size of Inlets, Inches	Telegraphic Code Word
LIST OF PISTON PATTERN PUMPS AND RECEIVERS									
1	3 x2 x4	12x24	9	5000	32 x22	23½	2	2	Payab
2	4½x3 x4	12x24	15	12500	39 x24	27¾	2	2	Payba
3	5¼x3½x5	14x28	36	25000	45 x20	33	2	2½	Payec
4	6 x4 x6	16x30	50	40000	50½x32	35½	2	3	Payce
5	7 x4½x7	16x30	65	45000	75 x45	35⅛	2	3	Payda
LIST OF RAM PATTERN PUMPS AND RECEIVERS									
2	4½x3x 4	12x24	15	12500	56 x30	34	2	2	Payef
3	5¼x3½x5	14x28	36	25000	69 x37	35	2	2½	Payfg
4	6 x4 x6	16x30	50	40000	71 x45	35½	2	3	Payhi
5	7½x5 x6	16x36	65	45000	75 x38	40	2	3	Payih

Duplex Fire Pumps

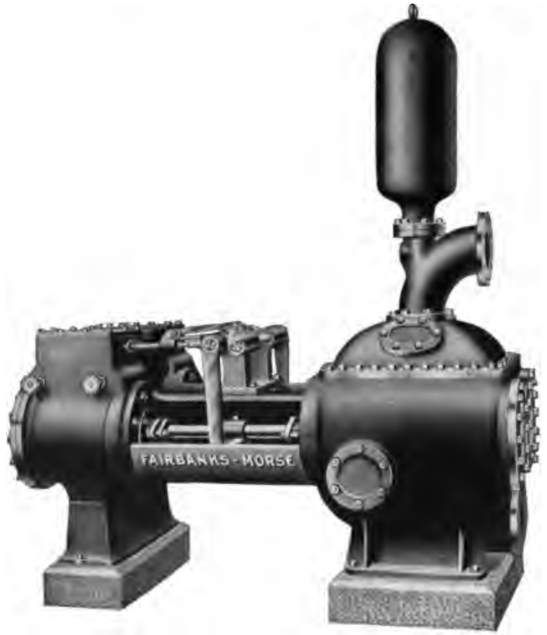


Fig. 357—Size 16x9x12.

These pumps are designed and constructed as quick working fire pumps; the valve areas and water passages are unusually large, to insure the complete and easy filling of the pump chambers when the pump is running at its greatest speed.

The valve motion is of new and superior design throughout and enables the pumps to be run at a very high rate of speed when required, without jar or any possibility of derangement.

The steam cylinders of the larger sizes of fire pumps may be compounded when desired. We usually fit these pumps with packed water pistons, but solid plungers will be furnished if so ordered. For list of Underwriter Fire Pumps, see following page. These pumps are built for a water pressure of 150 pounds per square inch.

Size of Pump			Gallons per Stroke of One Piston	Piston Travel, in Feet, per Minute Conservative Rating	Gallons per Minute at Rated Speed	Diameter of Pipes for Short Lengths, Inches				Floor Space, Inches	Telegraphic Code Word
Diameter of Steam Cylinders, Inches	Diameter of Water Cylinders, Inches	Length of Stroke, Inches				Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe		
10	5	12	1.02	100	204	2	2½	5	4	80x32	Peda
10	6	12	1.47	100	292	2	2½	6	5	80x32	Payko
12	6	12	1.47	100	292	2½	3	6	5	80x32	Payok
12	7	12	2.00	100	400	2½	3	8	6	80x35	Pagna
14	7	12	2.00	100	400	2½	3	8	6	80x42	Payrt
14	8	12	2.61	100	522	2½	3	8	6	80x42	Paytr
16	8	12	2.61	100	522	2½	3	8	6	82x42	Payrx
16	8½	12	2.94	100	588	2½	3	8	6	82x42	Pebab
16	9	12	3.30	100	660	2½	3	10	7	86x43½	Pebca
18	9	12	3.30	100	660	3	3½	10	7	92x48	Pebed
18	10	12	4.08	100	816	3	3½	10	8	92x48	Pebfa
18	10	18	6.12	125	1020	3	3½	10	8	105x48	Pebgo
20	10	18	6.12	125	1020	4	5	10	8	106x48	Pebhi
20	12	18	8.81	125	1467	4	5	12	10	108x48	Pebix

These pumps are fitted with two, four or six-way hose connections, when required, at extra cost.

Duplex Underwriter Fire Pumps

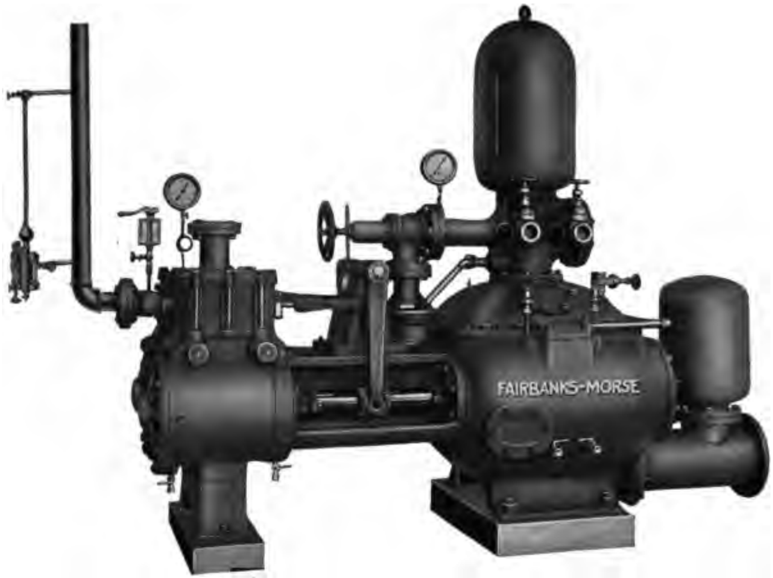


Fig. 358—Size 16x9x12.

The Underwriter Fire Pump is the title adopted by the Factory Mutual Fire Insurance Companies of Boston, Mass., to designate a duplex steam fire pump that is built in strict accordance with the specifications issued by those companies. These pumps are built of unusual strength, with very large valve areas, and the design contains several important features not found in other pumps of the usual construction.

These pumps are brass fitted throughout to prevent any possibility of the working parts rusting together in case the pump stands idle for a time.

With every pump there are furnished certain fittings called for by the specifications which are not required with our other fire pumps. Among these fittings are the following:

A suction elbow or tee, suction air chamber, brass priming pipes with air cocks and check valves, stroke gauge, capacity plate, steam gauge, water gauge, air relief valve, water relief valve with funnel, hose gate valves, lever handle drain valves for both the steam and water ends, sight feed lubricator and a hand oil pump for the steam cylinders.

We give every pump a most rigid test before shipment, including a test of the water end to 300 pounds static pressure.

Size of Pump			Underwriters Rating Gallons per Minute	Diameter of Pipes for Short Lengths, Inches				Floor Space, Inches	Telegraphic Code Word
Diameter of Steam Cylinders, Inches	Diameter of Water Pistons, Inches	Length of Stroke, Inches		Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe		
14	7	12	500	3	4	8	6	103x43	Pebok
16	9	12	750	3½	4	10	7	116x46½	Pebkx
18	10	12	1000	4	5	12	8	113x46½	Pebra
20	12	16	1500	5	6	14	10	144x55	Pebst

Compound Duplex Plunger and Ring Pattern Pumps

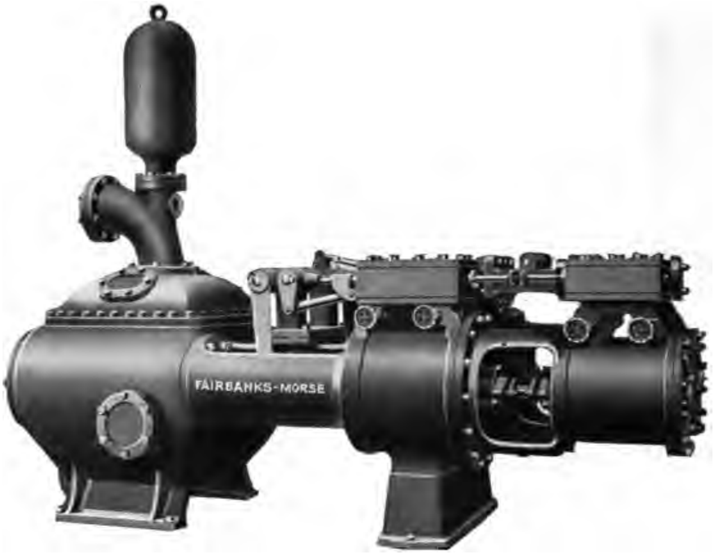


Fig. 359—Size 12—18x10x12. Illustrating our No. 1 Style Steam End.

This arrangement of steam cylinders regularly used on 12-inch stroke compound pumps.

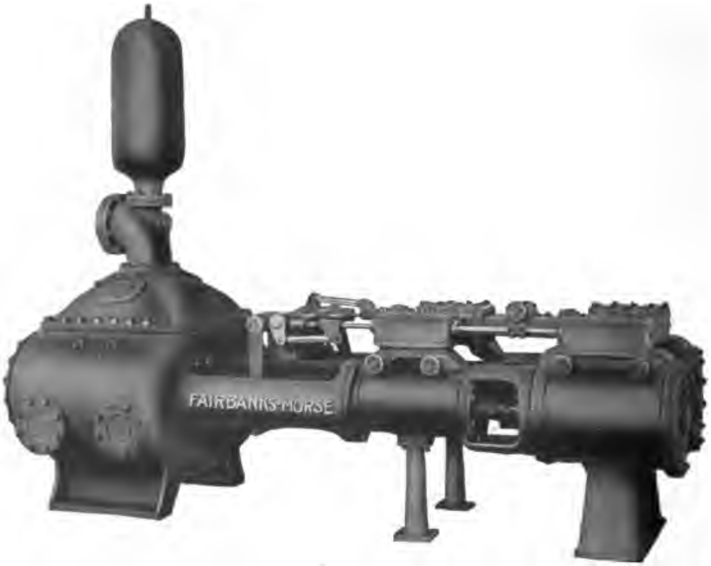


Fig. 360—Size 10—16x12x18. Illustrating our No. 2 Style Steam End.

This arrangement of steam cylinders regularly used on 18-inch stroke compound pumps, but No. 1 style steam end, shown above, will be furnished if ordered.

Compound Duplex Plunger and Ring Pattern Pumps

The machines illustrated on the opposite page are our designs of standard Compound Duplex Pumping Engines for general service.

The water boxes are shown in section by Figs. 330 and 331, on page 135.

The valve area in these pumps being large, and the arrangement of the water valves such as will give a very direct course for the water through the pump, they may be operated at maximum speed without undue shock or vibration, and with perfect safety to all moving parts. The stuffing boxes are all large and deep, and the interior of the valve chambers may be easily reached through ample size hand holes.

By compounding the steam ends of our pumps, whereby the effect of a cut-off is secured, a saving of from 30 to 35 per cent. is made in the amount of steam used over that of simple duplex pumps. While the first cost is more than that of a simple duplex pump, yet the saving in fuel, when the work is of such a character as to require regular service, very soon pays for the difference in first cost.

Compound cylinders are applied extensively to hydraulic elevator pumps, pressure pumps, tank pumps, mine pumps, and pumps used in larger size water works plants.

A special attachment can be fitted to these pumps whereby steam at boiler pressure may be admitted to both the high and low pressure cylinders for fire service. This is accomplished by the single movement of a lever, and a compound pump is instantly converted into a high pressure fire pump, the full power of all four cylinders being obtained.

These machines will stand a constant working pressure not exceeding 150 pounds per square inch.

Diameter of Steam Cylinders, Inches	Diameter of Water Cylinders, Inches	Length of Stroke, Inches	Capacity in Gallons per Stroke of One Piston	Piston Travel, in Feet, per Minute Conservative Rating	Gallons per Minute at Rated Speed	Pipe Sizes for Short Lengths, Inches				Floor Space, Inches	Telegraphic Code Word
						Steam	Exhaust	Suction	Discharge		
6 & 10	6	12	1.47	80	235	1	2½	5	4	103x32	Pebtx
6 & 10	7	12	2.00	80	320	1	2½	6	5	103x33	Pecan
8 & 12	7	12	2.00	80	320	1½	3	6	5	105x33	Peka
9 & 14	7	12	2.00	80	320	2	3	6	5	109x42	Pecde
8 & 12	8	12	2.61	80	417	1½	3	6	5	107x37	Peced
9 & 14	8	12	2.61	80	417	2	3	6	5	109x42	Pecfg
10 & 16	8	12	2.61	80	417	2	3	6	5	114x42	Pecgf
8 & 12	8½	12	2.94	80	470	1½	3	7	6	107x37	Pechi
9 & 14	8½	12	2.94	80	470	2	3	7	6	109x42	Pecih
10 & 16	8½	12	2.94	80	470	2	3	7	6	114x42	Pecjk
8 & 12	9	12	2.94	80	530	1½	3	7	6	107x42	Peckj
9 & 14	9	12	3.30	80	530	2	3	7	6	109x42	Peclm
10 & 16	9	12	3.30	80	530	2	3	7	6	114x42	Pence
12 & 18	9	12	3.30	80	530	2½	3½	7	6	120x48	Pecml
14 & 20	9	12	3.30	80	530	2½	5	7	6	125x50	Pecno
8 & 12	10	12	4.08	80	652	1½	3	8	7	112x43½	Parvy
9 & 14	10	12	4.08	80	652	2	3	8	7	112x46	Penda
10 & 16	10	12	4.08	80	652	2	3	8	7	117x46	Pecop
12 & 18	10	12	4.08	80	652	2½	3½	8	7	120x48	Pecpo
14 & 20	10	12	4.08	80	652	2½	5	8	7	125x50	Pecqr
8 & 12	12	12	5.87	80	939	1½	3	10	8	117x48	Pecrq
9 & 14	12	12	5.87	80	939	2	3	10	8	123x54	Pecst
10 & 16	12	12	5.87	80	939	2	3	10	8	124x56	Pects
12 & 18	12	12	5.87	80	939	2½	3½	10	8	124x56	Pecux
14 & 20	12	12	5.87	80	939	2½	5	10	8	126x56	Pecva
9 & 14	10	18	6.12	100	816	2	3	8	7	144x48	Pecyx
10 & 16	10	18	6.12	100	816	2	3	8	7	144x48	Pedab
12 & 18	10	18	6.12	100	816	2½	3½	8	7	144x48	Pedba
14 & 20	10	18	6.12	100	816	2½	5	8	7	144x52	Pedcd
9 & 14	12	18	8.81	100	1174	2	3	10	8	140x48	Pedef
10 & 16	12	18	8.81	100	1174	2	3	10	8	144x48	Pedfe
12 & 18	12	18	8.81	100	1174	2½	3½	10	8	144x56	Pedgh
14 & 20	12	18	8.81	100	1174	2½	5	10	8	146x56	Pedhg
9 & 14	14	18	12.00	100	1600	2	3	12	10	144x56	Pedik
10 & 16	14	18	12.00	100	1600	2	3	12	10	144x56	Pedki
12 & 18	14	18	12.00	100	1600	2½	3½	12	10	144x56	Pedlm
14 & 20	14	18	12.00	100	1600	2½	5	12	10	146x56	Pedml
10 & 16	16	18	15.67	100	2088	2	3	14	12	162x68	Pedno
12 & 18	16	18	15.67	100	2088	2½	3½	14	12	162x68	Pedon
14 & 20	16	18	15.67	100	2088	2½	5	14	12	164x68	Pedpq

NOTE.—Any of the above pumps will be furnished brass fitted, if desired, at a slight additional cost. *See Notes 1 and 2, page 137, concerning capacities.*

Triple Expansion Duplex Plunger and Ring Pattern Pumping Engine for Water Works Service, Etc.

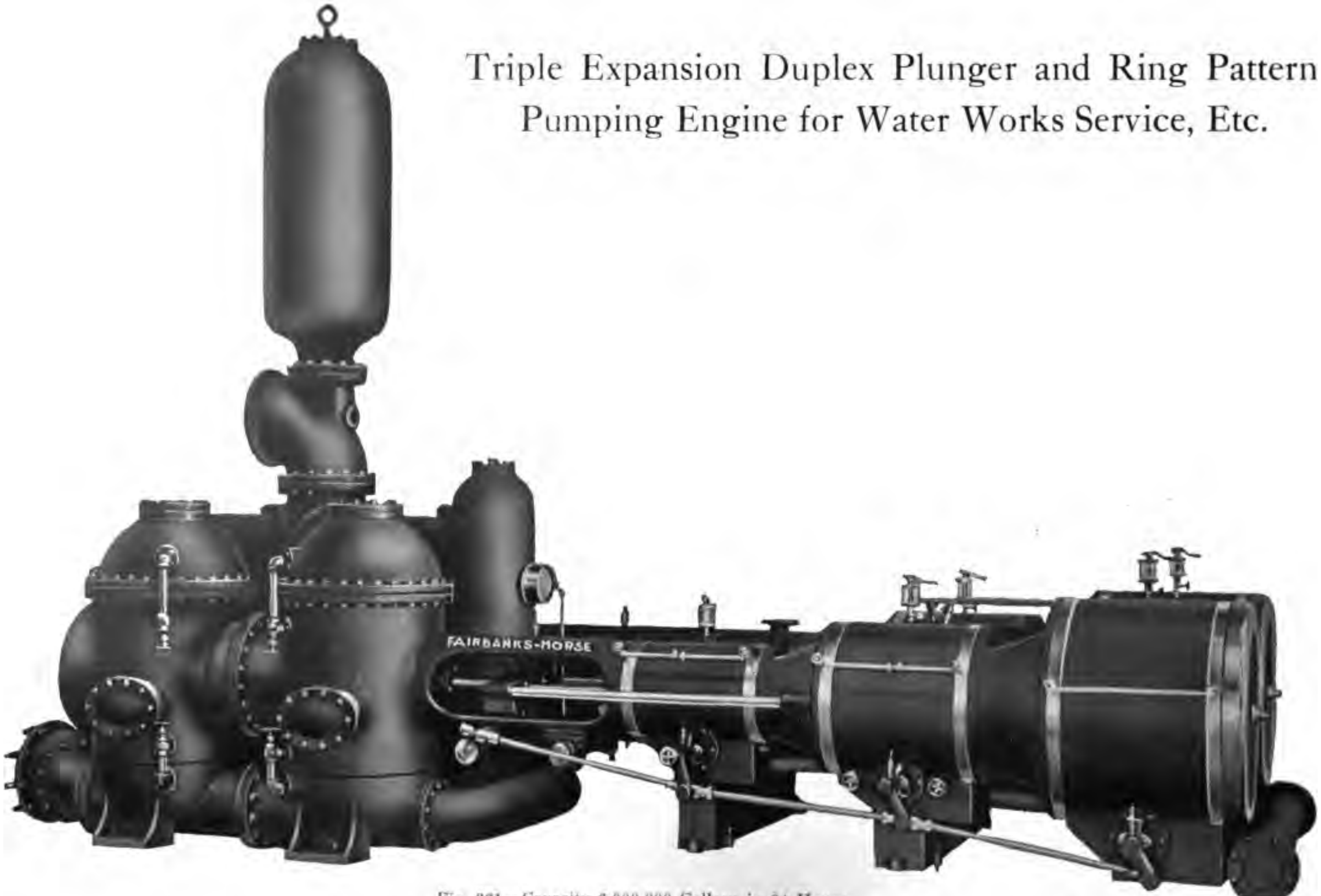


Fig. 361—Capacity 6,000,000 Gallons in 24 Hours.

Triple Expansion Duplex Pumping Engines for Water Works Service, Etc.

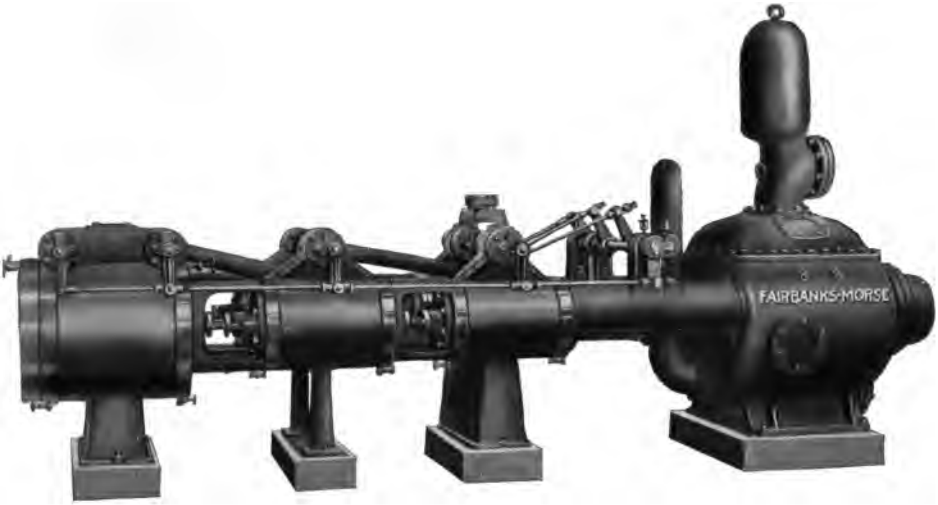


Fig. 362—Illustrating 18-inch Stroke, Triple Expansion Plunger and Ring Pattern Pumping Engine. Capacity 2,000,000 Gallons in 24 Hours.

The Triple Expansion machines illustrated above and on the preceding page are of designs which have proven very economical in the consumption of steam and the economy of operation is such that when considered in connection with the first cost of the pump it gives this type of machine the preference in many situations.

The steam end is fitted with semi-rotative valves, and the main valves on the high pressure steam cylinders are fitted with a riding cut-off valve, which can be adjusted by hand while the engine is in operation.

The machine is designed with a view to rendering all parts easy of access, and the arrangement of the piston rods and cradles is such, in the larger sizes, as to permit removing the steam pistons when necessary without having to take down any of the cylinders or cradles.

These machines are designed to be operated condensing, using a surface condenser arranged in the suction or discharge line, as may be best suited to a particular situation, or exhausting into a jet condenser, if such type is preferred.

Duplex Outside Center Packed Plunger Pumps

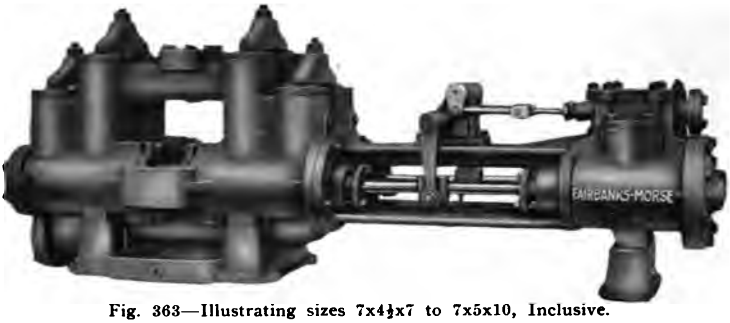


Fig. 363—Illustrating sizes 7x4½x7 to 7x5x10, Inclusive.

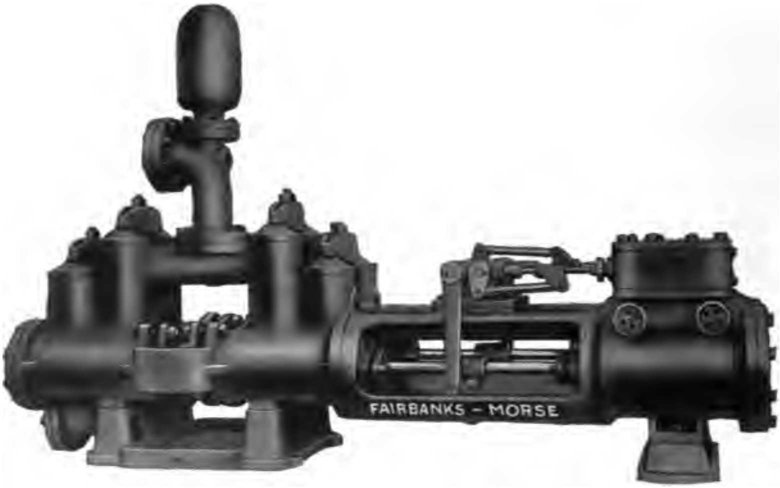


Fig. 364—Illustrating sizes 8x5x12 to 12x6x12, inclusive, except that 8x5x12 is not regularly supplied with air chamber and cushion valves.

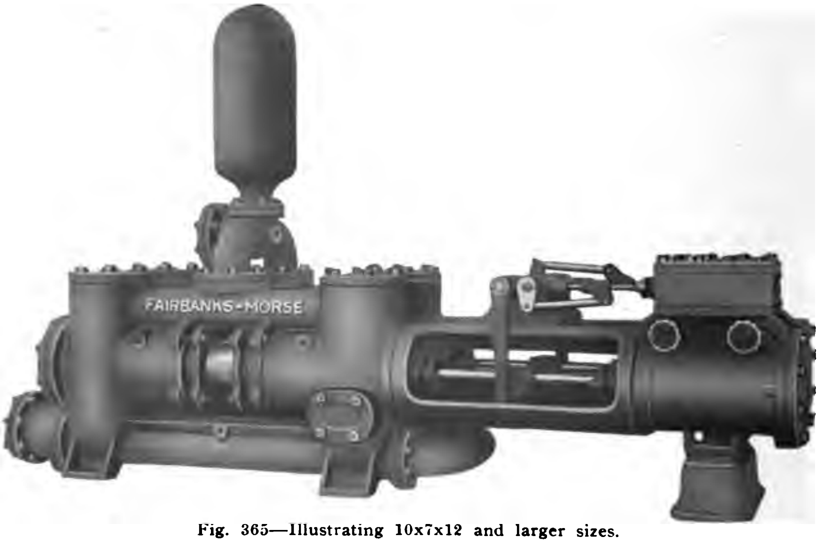


Fig. 365—Illustrating 10x7x12 and larger sizes.

Duplex Outside Center Packed Plunger Pumps

These pumps are of a type especially adapted for situations where the liquid to be handled contains considerable grit or sand, or where the pressure to be pumped against is moderately high. They are also well adapted for handling hot water.

In this type of pump, the plungers being externally packed, are always in sight of the attendant engineer, and any leakage can be at once detected, and the stuffing boxes adjusted or repacked very quickly.

All parts of these pumps are easy of access, the arrangement of the water end being such as to permit the water valves being easily reached. All the stuffing boxes are large and deep, so that an ample allowance of packing may be used.

All parts of the pumps are heavily proportioned, with a view to their being durable under the heavy service for which they are commonly used.

The pump ends of the machines listed will stand a constant working pressure not exceeding 200 pounds, but we can furnish machines of this type with pump ends strong enough for 250 pounds working pressure.

Diameter of Steam Cylinders, Inches	Diameter of Water Plungers, Inches	Length of Stroke, Inches	Capacity in Gallons per Stroke of One Plunger	Piston Travel, in feet, per Minute Conservative Rating	Gallons Delivered per Minute by both Plungers at Rated Speed	Size of Pipes for Short Lengths, Inches				Floor Space, Inches	Telegraphic Code Word
						Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe		
* 7	4½	7	.48	55	91	1½	2	4	3	72x21	Pifan
* 7	5	7	.59	55	112	1½	2	4	3	72x21	Pifna
* 7	4½	10	.69	70	116	1½	2	4	3	88x22½	Pedtu
* 7	5	10	.85	70	142	1½	2	4	3	88x22½	Pedut
† 8	5	12	1.02	80	163	1½	2	4	3	94x25	Pedvx
†10	5	12	1.02	80	163	2	2½	4	3	97x27	Pedwy
† 8	6	12	1.47	80	235	1½	2	5	4	98x29	Pedxa
†10	6	12	1.47	80	235	2	2½	5	4	98x29	Pefab
12	6	12	1.47	80	235	2½	3	5	4	102x31	Pefba
10	7	12	2.00	80	320	2	2½	6	5	116x29½	Pefcd
12	7	12	2.00	80	320	2½	3	6	5	117x31	Pefdc
14	7	12	2.00	80	320	2½	3	6	5	117x38½	Pefef
12	8	12	2.61	80	417	2½	3	6	5	121x37	Pefgh
14	8	12	2.61	80	417	2½	3	6	5	124x38½	Pefhg
16	8	12	2.61	80	417	2½	3	6	5	125x41	Pefij
14	9	12	3.30	80	530	2½	3	7	6	124x39	Pefkl
16	9	12	3.30	80	530	2½	3	7	6	125x41	Peflk
18	9	12	3.30	80	530	3	3½	7	6	126x45	Pefmo
14	10	12	4.08	80	652	2½	3	8	7	128x39	Pefna
16	10	12	4.08	80	652	2½	3	8	7	132x40	Pefop
18	10	12	4.08	80	652	3	3½	8	7	134x45½	Pefrs
18	10	18	6.12	100	816	3	3½	8	7	150x47	Pefsr
20	10	18	6.12	100	816	4	5	8	7	152x47	Peftu
14	12	18	8.81	100	1174	2½	3	10	8	156x49	Pefut
16	12	18	8.81	100	1174	2½	3	10	8	157x49	Pefoy
18	12	18	8.81	100	1174	3	3½	10	8	158x49	Pefxz
20	12	18	8.81	100	1174	4	5	10	8	160x51	Pegab
18	14	18	12.00	100	1600	3	3½	12	10	162x62	Pegba
20	14	18	12.00	100	1600	4	5	12	10	168x62	Pegcd

*Sizes 7x4½x7 to 7x5x10, inclusive, are similar in appearance to Fig. 363, on page 158.

†Sizes 8x5x12 to 12x6x12, inclusive, are similar in appearance to Fig. 364, on page 158, excepting that sizes 8x5x12 and 8x6x12 are not regularly provided with air chamber or cushion valves.

Other sizes listed are similar in appearance to Fig. 365, on page 158.

Any of the above pumps will be fitted with composition plungers, lined glands, and bronze rods at a slight additional cost.

See Notes 1 and 2, Page 137, concerning capacities.

Compound Duplex Outside Center Packed Plunger Pumps

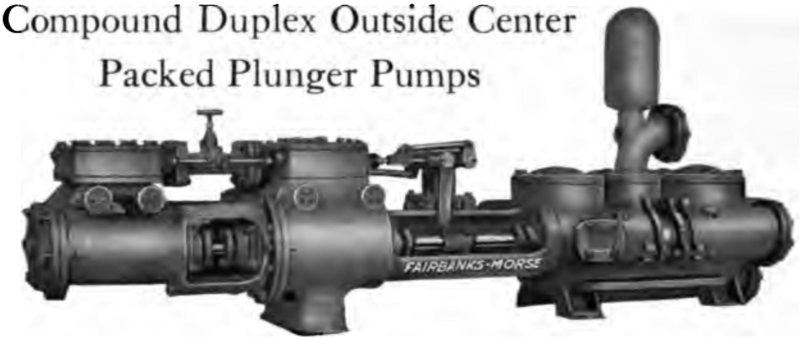


Fig. 366—Illustrating 8x12x6x12 Compound Duplex Outside Center Packed Plunger Pump.

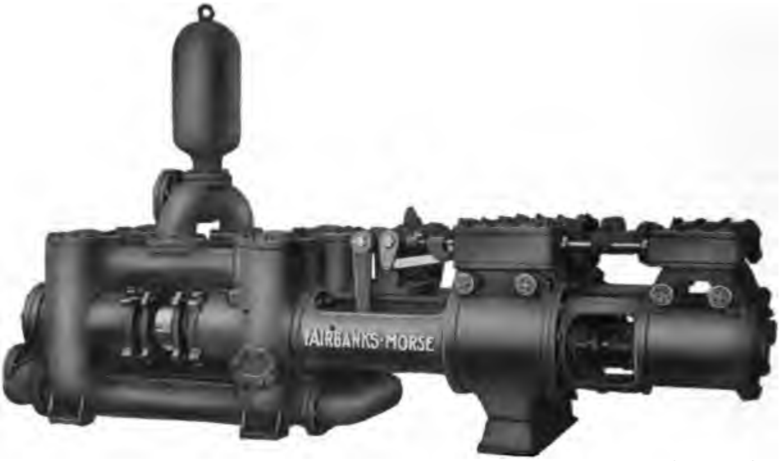


Fig. 367—Illustrating 9x14x7x12 and larger 12-inch stroke Compound Duplex Outside Center Packed Plunger Pump with No. 1 style steam end.

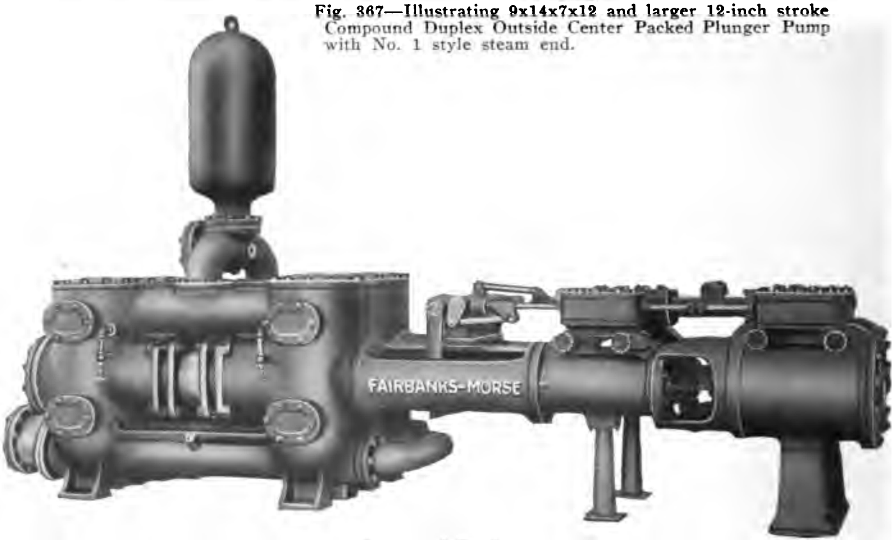


Fig. 368—Illustrating 18-inch stroke Compound Duplex Outside Center Packed Plunger Pump with No. 2 style steam end.

Compound Duplex Outside Center Packed Plunger Pumps

Pumps illustrated on the preceding pages are of the compound, duplex, outside center packed plunger type.

By compounding the steam end of these pumps there is obtained a saving of from 30 to 35% in the amount of steam required for a given service, over that used by a simple duplex pump.

In many situations it is advisable to proportion the steam ends so that the pumps may be operated condensing and in this manner a very high efficiency is obtained.

The valve areas in these pumps are large and the water passages through the pumps very direct. The framing is massive and well proportioned, so that the pumps can be depended upon to give excellent service under the most exacting conditions.

The pump ends of the machines listed will stand a constant working pressure not exceeding 200 pounds, but we can furnish machines of this type with pump ends strong enough for 250 pounds working pressure.

Diameter of Steam Cylinders, Inches	Diameter of Water Plungers, Inches	Length of Stroke, Inches	Capacity in Gallons per Stroke of One Plunger	Piston Travel Feet per Minute Conservative Rating	Gallons Delivered per Minute by both Plungers at Rated Speed	Pipe Sizes for Short Lengths, Inches				Floor Space, Inches	Telegraphic Code Word
						Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe		
*8 & 12	5	12	1.02	80	163	1½	3	4	3	124x32	Pegdc
9 & 14	5	12	1.02	80	163	2	3	4	3	126x37	Pegef
10 & 16	5	12	1.02	80	163	2	3	4	3	128x37	Pegfe
8 & 12	6	12	1.47	80	235	1½	3	5	4	124x32	Peghi
9 & 14	6	12	1.47	80	235	2	3	5	4	152x41	Pegih
10 & 16	6	12	1.47	80	235	2	3	5	4	152x41	Pegkl
8 & 12	7	12	2.00	80	320	1½	3	6	5	148x34	Peglk
9 & 14	7	12	2.00	80	320	2	3	6	5	152x41	Pegmo
10 & 16	7	12	2.00	80	320	2	3	6	5	154x41	Pegna
12 & 18	7	12	2.00	80	320	2½	3½	6	5	157x48	Pegop
8 & 12	8	12	2.61	80	417	1½	3	6	5	156x37	Pegpo
9 & 14	8	12	2.61	80	417	2	3	6	5	156x41	Pegrs
10 & 16	8	12	2.61	80	417	2	3	6	5	157x41	Pegsr
12 & 18	8	12	2.61	80	417	2½	3½	6	5	159x48	Pegtu
14 & 20	8	12	2.61	80	417	2½	5	6	5	161x48	Pegut
8 & 12	10	12	4.08	80	652	1½	3	8	7	157x39	Pegvx
9 & 14	10	12	4.08	80	652	2	3	8	7	163x41	Pegwy
10 & 16	10	12	4.08	80	652	2	3	8	7	165x41	Pegxz
12 & 18	10	12	4.08	80	652	2½	3½	8	7	166x45	Pehab
14 & 20	10	12	4.08	80	652	2½	5	8	7	167x45	Pehba
10 & 16	8	18	3.92	100	522	2	3	8	7	176x46	Pehcd
12 & 18	8	18	3.92	100	522	2½	3½	8	7	182x46	Pehdc
14 & 20	8	18	3.92	100	522	2½	5	8	7	184x46	Pehef
10 & 16	10	18	6.12	100	816	2	3	8	7	186x48	Pehfe
12 & 18	10	18	6.12	100	816	2½	3½	8	7	188x48	Pehgh
14 & 20	10	18	6.12	100	816	2½	5	8	7	190x48	Pehij
10 & 16	12	18	8.81	100	1174	2	3	10	8	196x49	Pehkl
12 & 18	12	18	8.81	100	1174	2½	3½	10	8	197x51	Pehlk
14 & 20	12	18	8.81	100	1174	2½	5	10	8	204x51	Pehmo
12 & 18	14	18	12.00	100	1600	2½	3½	12	10	209x62	Pehna
14 & 20	14	18	12.00	100	1600	2½	5	12	10	211x62	Pehop

Any of the above pumps will be fitted with composition plungers, lined glands, and bronze rods at a slight additional cost.

See Notes 1 and 2, page 137, concerning capacities.

Triple Expansion Duplex Outside Center Packed Plunger Pumping Engines for Water Works, Mine Service, Etc.

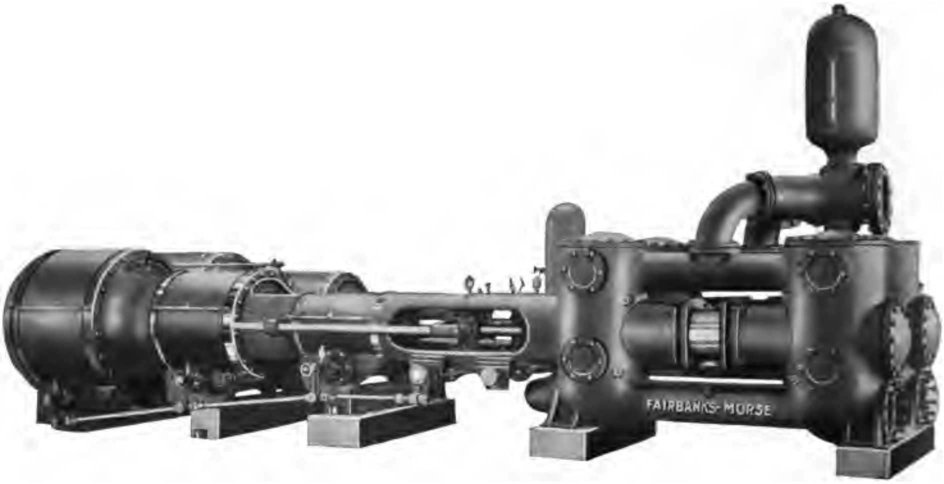


Fig. 369—Illustrating 24-inch Stroke Machine.

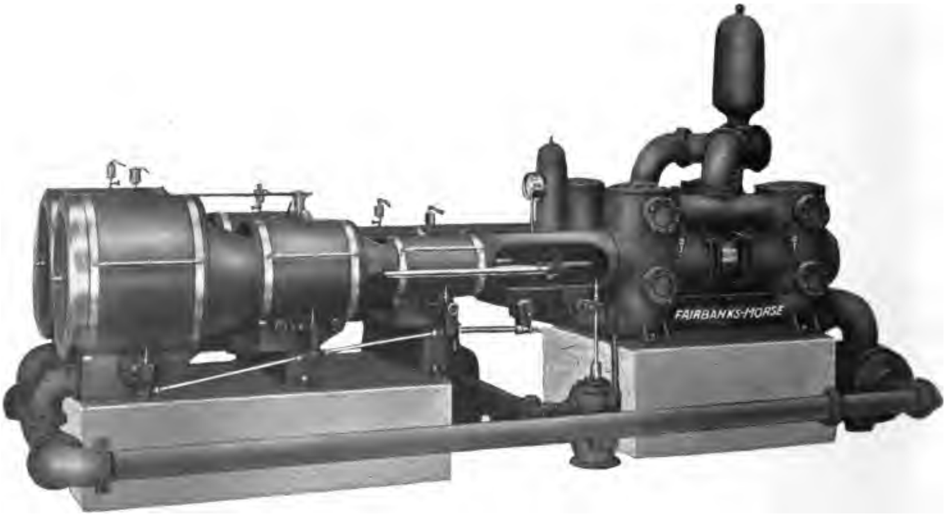


Fig. 370—Illustrating 24-inch Stroke Machine with Surface Condenser in Suction Pipe, attached Air Pump and Reheaters between Steam Cylinders.

See page 157, for brief description of Steam End of Our Triple Expansion **Pumping Engines.** Complete detail specification sent on request.

Triple Expansion Duplex Outside Center Packed Plunger Pumping Engines for Water Works, Mine Service, Etc.

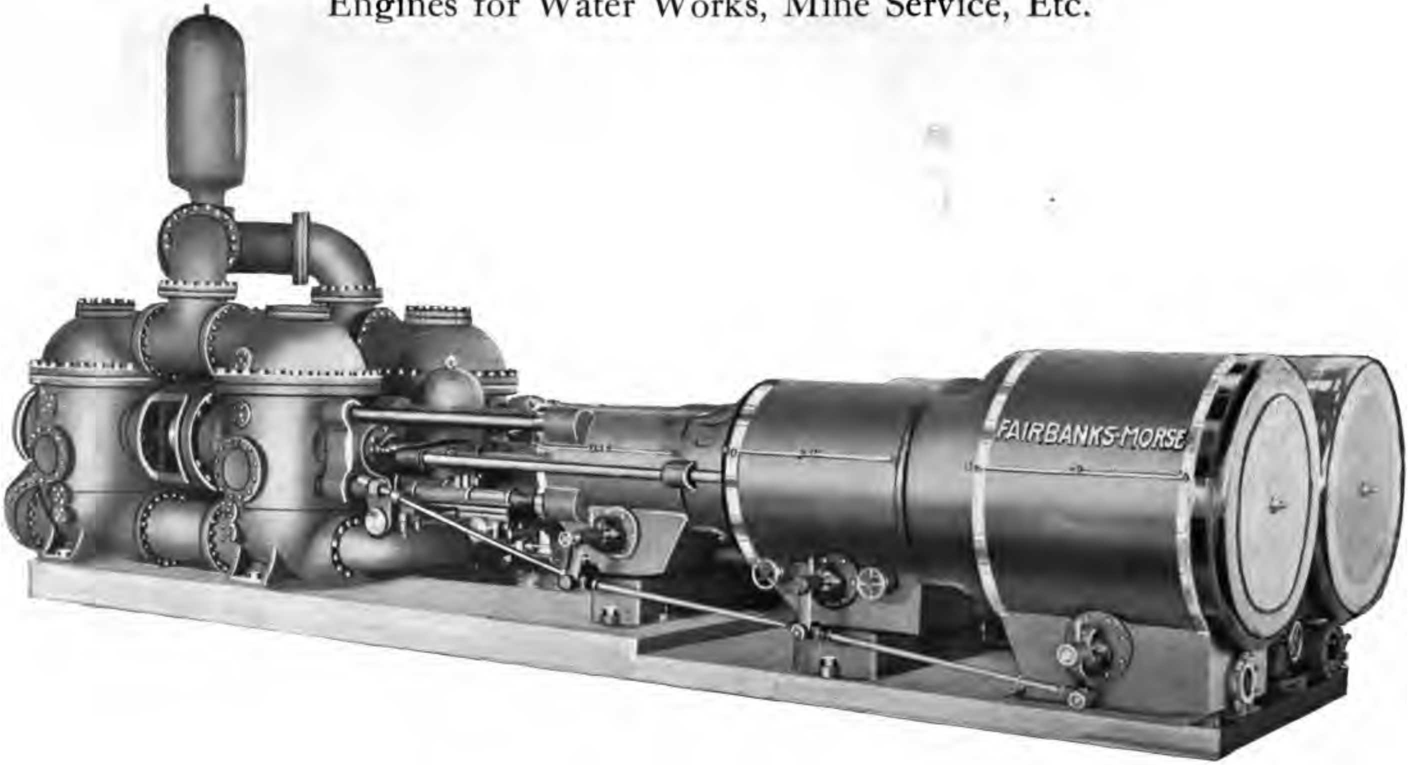


Fig. 371—Illustrating 36-inch stroke machine, capacity 7,500,000 U. S. gallons per day. See page 157, for brief description of the steam end of our triple expansion pumps.

Duplex Valve Pot Pumps

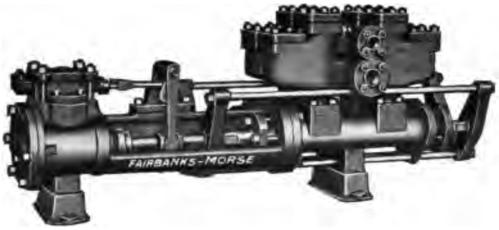


Fig. 372—Illustrating general design of sizes 4½x3x4 to 7x5x8, inclusive.

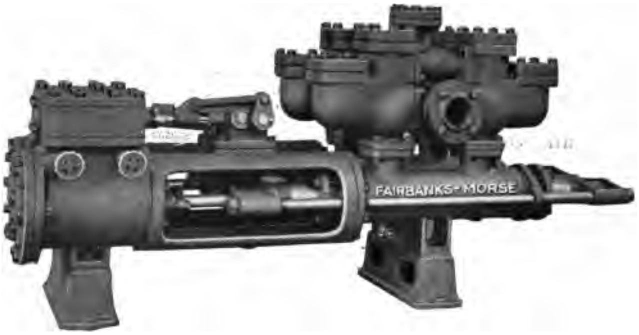


Fig. 373—Illustrating sizes 8x4x10 to 16x7x10, inclusive.

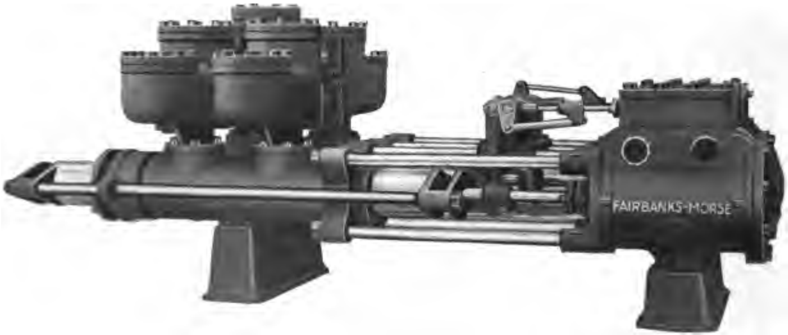


Fig. 374—Illustrating size 12x7x12.

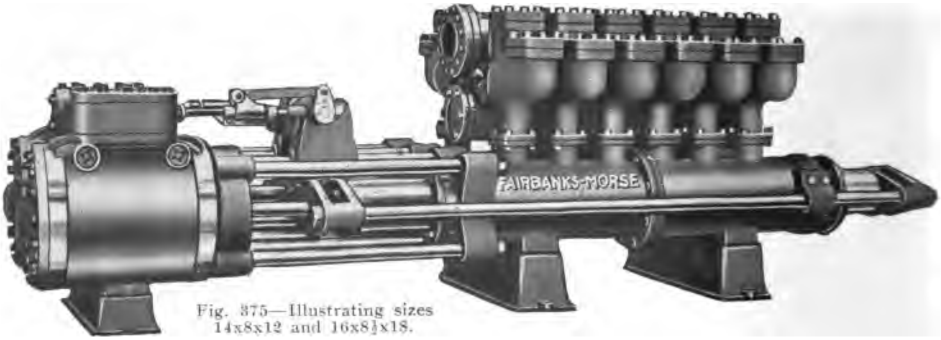


Fig. 375—Illustrating sizes 14x8x12 and 16x8½x18.

Duplex Valve Pot Pumps

The pumps listed below and illustrated on the preceding page are designed for moderately heavy pressures, as for example, in pipe line service where the liquid to be pumped is of light gravity, the operation of hydraulic lifts, in mine service, etc.

The valve pots are interchangeable.

There are four single acting plungers, two on each side of the pump, being connected by means of crossheads and steel side rods, in such a manner that stuffing boxes can be easily reached for adjustment or repacking.

These pumps make very efficient boiler feeders where high steam pressure carried requires a machine stronger than our piston pattern boiler feed pumps.

Diam. of Steam Cylinders, Inches	Diam. of Water Plungers, Inches	Length of Stroke, Inches	Water Pressure Pumps are proportioned for	Gallons per Stroke of One Plunger	Piston Travel Feet per Minute Conservative Rating	Gallons per Minute at Rated Speed	Pipe Sizes for Short Lengths, Inches				Floor Space, Inches	Telegraphic Code Word
							Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe		
4½	2	4	300	.05	35	11	½	¾	1¼	1	49x18½	Pehpa
4½	3	4	175	.12	35	25	½	¾	2	1½	49x18½	Pehrs
5½	2½	5	300	.10	40	20	1	1¼	2	1	64x21	Pehsr
5¼	3½	5	175	.20	40	40	1	1¼	2½	1	64x21	Pehtu
6	3	6	300	.18	45	33	1	1½	2½	1½	70x24½	Pehut
6	4	6	175	.33	45	58	1	1½	3	2	70x24½	Pehwx
7	5	8	150	.68	60	122	1½	2	4	3	94x26	Pehxa
8	4	10	300	.54	70	91	1½	2	4	3	99x30	Pehyz
10	4	10	400	.54	70	91	2	2½	4	3	100x30	Pekab
8	5	10	200	.85	70	142	1½	2	4	3	99x30	Pekba
10	5	10	300	.85	70	142	2	2½	4	3	100x30	Pekcd
12	5	10	400	.85	70	142	2½	3	4	3	104x32	Pekdc
10	6	10	200	1.22	70	204	2	2½	5	4	104x33	Pekef
12	6	10	300	1.22	70	204	2½	3	5	4	108x33	Pekfe
14	6	10	400	1.22	70	204	2½	3	5	4	108x33	Pekgh
14	7	10	300	1.66	70	280	2½	3	6	5	110x53	Pekhg
16	7	10	400	1.66	70	280	2½	3	6	5	112x53	Pekij
12	7	12	200	2.00	80	320	2½	3	6	5	124x53	Peklm
14	8	12	250	2.61	80	320	2½	3	7	6	141x58	Pekml
16	8½	18	250	4.42	100	588	2½	3	7	6	175x50	Pekno

See Notes 1 and 2, page 137, concerning capacities.

Compound Duplex Pumping Engines—Valve Pot Type

HEAVY PRESSURE PUMPS FOR OIL LINE SERVICE, ETC.

We have furnished many pumps of the design shown below for pipe line service.

The Producers Transportation Company are operating twenty-three of these machines on their pipe lines in California.

The pumps all have cast steel pump ends, and as the steam ends are compounded and the exhaust steam used in oil heaters, a very high over-all efficiency is secured.

In these machines, as in all pumps which we manufacture for oil line service, the valves are of special construction, valve areas very large, the passages for the liquid through the pumps equally large and as direct as it is possible to make them.

This line of pumps is designed for a working pressure of 1,000 pounds per square inch.

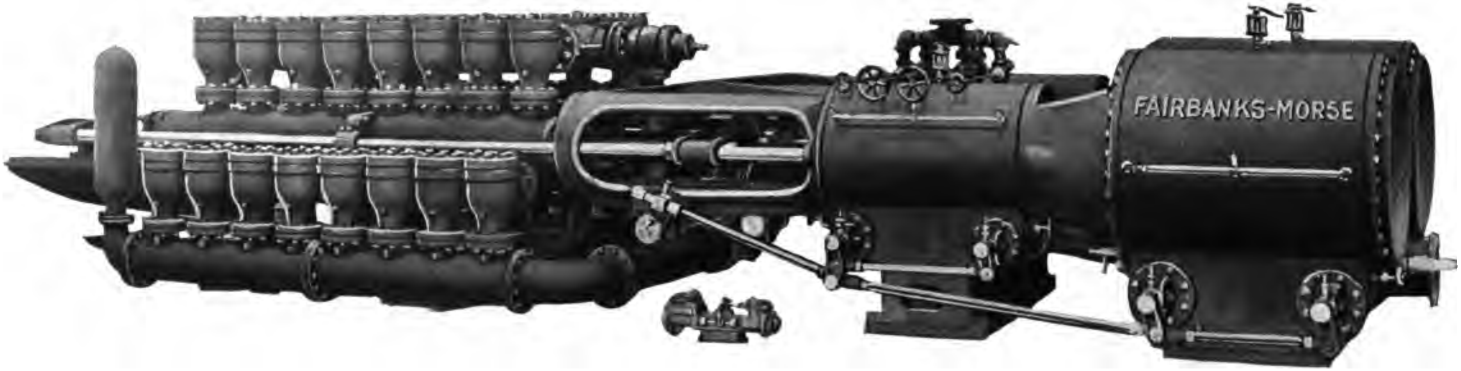


Fig. 376—Illustrating 36-inch stroke pump. Small pump is 3x2x4 Boiler Feed Pump.

Heavy Pressure Pumps for Oil Line Service, Etc.

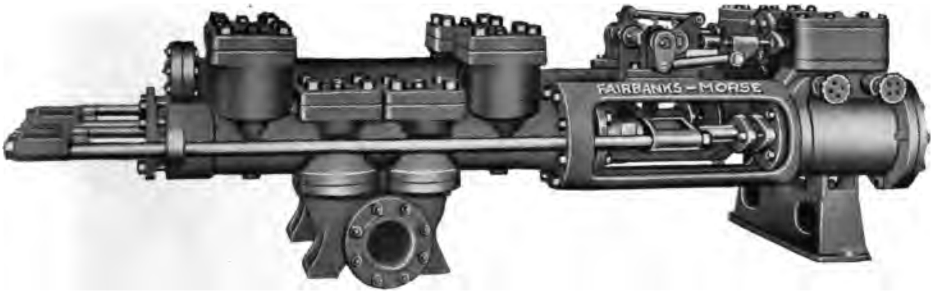


Fig. 377—Illustrating our "Coalinga" Type Pump.

The problem of handling heavy gravity crude oil is a most difficult one to contend with. Pumps to handle this oil successfully must be made in a most substantial manner, with unusually large valve areas, and the passages for the liquid through the pumps must be large and as direct as possible.

Pumps which are designed primarily for handling water have been found not well adapted for oil line work.

Our "Coalinga" type pumps were designed especially to meet this unusually severe service. The pumps are of the outside end packed plunger, semi-valve pot design, with water ends in separate castings.

The valves we employ were designed and proportioned especially for handling thick oil, and the liquid will pass through the seats and valves without appreciable friction loss, which insures the pump chambers filling at each stroke and permits of operating the pumps at high speeds when necessary to move a given volume of oil quickly.

The pump ends of these machines are designed and tested to stand a working pressure of 750 pounds per square inch.

Diameter of Steam Cylinder, Inches	Diameter of Pump Cylinder, Inches	Length of Stroke, Inches	Gallons per Stroke of One Plunger	Pipe Sizes for Short Lengths, Inches				Floor Space, Inches	Telegraphic Code Word
				Steam	Ex-haust	Suc-tion	Dis-charge		
8	3	10	.30	1½	2	5	4	116x40	Pekon
8	4	10	.54	1½	2	5	4	116x40	Pekpo
10	4	10	.54	2	2½	5	4	118x40	Pekrs
12	4	12	.66	2½	3	5	4	128x40	Peksr
14	5	12	1.02	2½	3	6	5	136x47	Pektu
16	5	12	1.02	2½	3	6	5	137x47	Pekut
18	6	18	2.20	3	3½	7	6	182x42	Pekuy

We also furnish these pumps with compound steam ends.

Special Duplex Piston Pattern Pumps

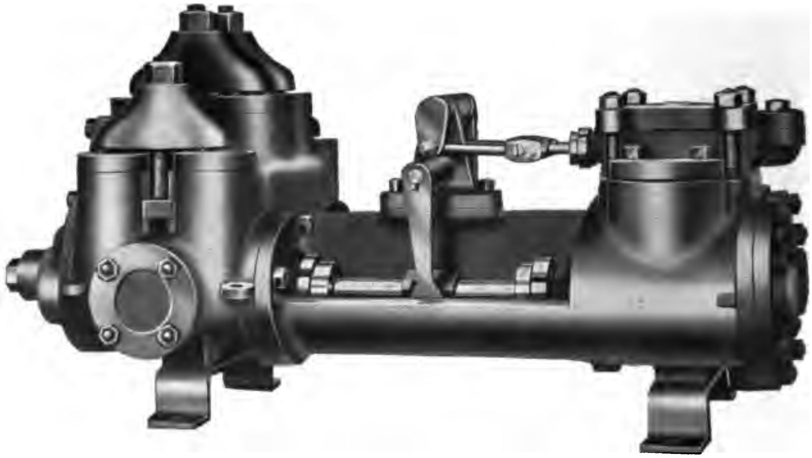


Fig. 378--Size 6x3x6.

This pump built in 6x3x6 size is especially adapted for rotary and diamond drilling outfits and other conditions where the liquid to be handled contains considerable sand or grit, or where pressure to be pumped against is moderately high.

The valve chambers are equipped with cast iron covers, and heavy cast iron yokes are provided to hold them in position.

This arrangement permits very quick and easy access to the valve chambers.

Diameter of Steam Cylinders, Inches	Diameter of Water Plungers, Inches	Length of Stroke, Inches	Suction Pipe, Inches	Discharge Pipe, Inches	Steam Pipe, Inches	Exhaust Pipe, Inches	Telegraphic Code Word
6	3	6	2	1	1	1½	Petom

Santa Maria Pattern Pumps

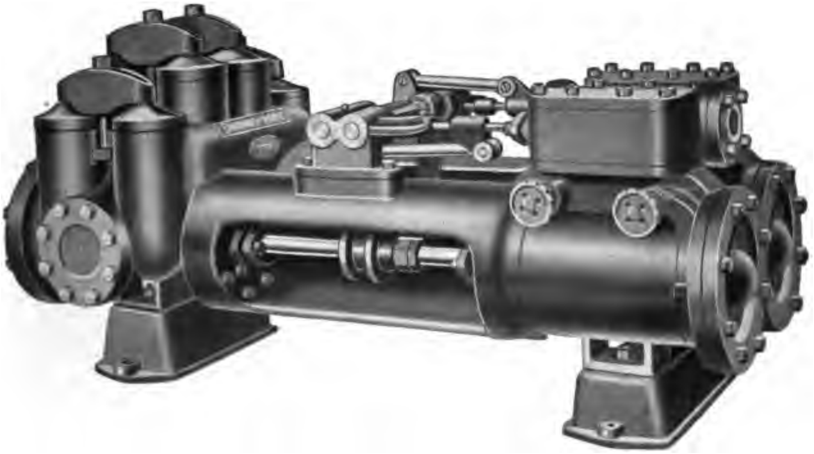


Fig. 379—Size 10x5½x12.

FOR
ROTARY DRILLING OUTFITS
ALSO FOR USE WITH CIRCULATORS

Especially designed to pump water containing a large percentage of grit and sand.

These pumps are built heavy enough to work against high pressures when being used on deep wells.

Special valves, seats, valve pot covers and cylinders are features found in these pumps.

Diameter of Steam Cylinders, Inches	Diameter of Water Plungers, Inches	Length of Stroke, Inches	Suction Pipe, Inches	Discharge Pipe, Inches	Steam Pipe, Inches	Exhaust Pipe, Inches	Telegraphic Code Word
8	4¾	10	4	3	1½	2	Palama
10	5½	12	5	4	2	2½	Petno
12	6¾	12	6	5	2½	3	Palmodic

Heavy Pressure Pumps

FOR USE IN MINES, STEEL WORKS, ROLLING MILLS, AND FOR THE OPERATION OF VARIOUS KINDS OF HYDRAULIC MACHINERY

The pumping engines illustrated below and on the following page are of the compound, duplex, valve pot type and are built for working pressures varying from 300 to 10,000 pounds per square inch.

For the heavier pressures the pump ends are made of cast or forged steel.

Fig. 380 illustrates pump with our No. 2 style steam end, in which the high and low pressure cylinders are connected by cast iron cradles and both pistons are carried on a single piston rod.

Fig. 381 illustrates our No. 3 style steam end, in which the high and low pressure cylinders are bolted metal to metal but arranged without any steam joint between them.

Fig. 382 illustrates a pump with our No. 4 style steam end, in which the high and low pressure cylinders are connected by cradles, and the low pressure pistons are connected to the crossheads by two piston rods passing outside of the high pressure cylinder, and the high pressure piston on each side is connected to the crosshead by a single rod. All three rods are arranged in the same horizontal plane.

In all of these designs both the high and low pressure pistons can be removed without having to take down any of the heavier parts of the machines.

The pumps are provided with four externally packed plungers, working into the ends of the water cylinder barrels.

The water valves are located in separate chambers, or pots, which are interchangeable.

We build these pumps with simple, compound or triple expansion steam ends.

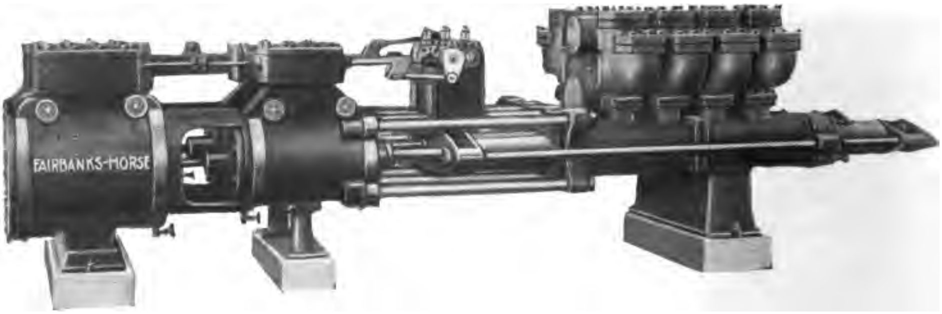


Fig. 380—Size 12x18x7x18. Style No. 2 Steam End.

Heavy Pressure Pumps

FOR USE IN MINES, STEEL WORKS, ROLLING MILLS, AND FOR THE OPERATION OF VARIOUS KINDS OF HYDRAULIC MACHINERY

Compound Duplex Valve Pot Pumps

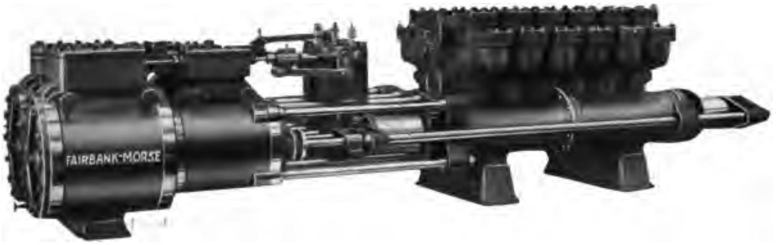


Fig. 381—Size 12-20x8½x18. Style No. 3 Steam End.

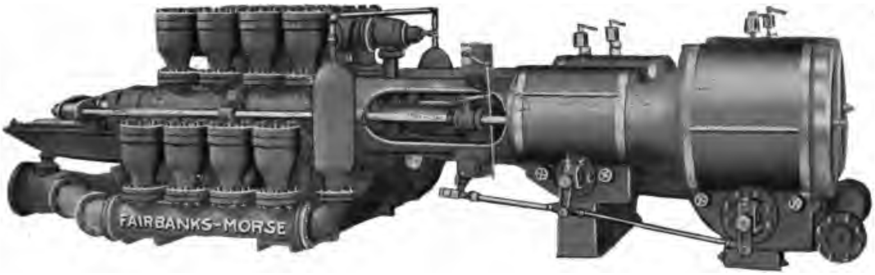


Fig. 382—Size 19-34x6x24. Style No. 4 Steam End.

Triple Expansion Valve Pot Mine Pumps

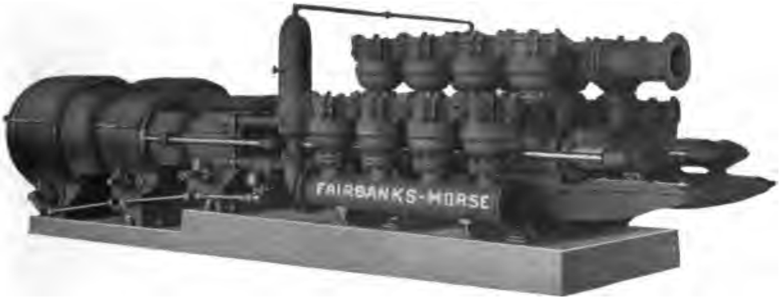


Fig. 383—Illustrating 24-inch stroke machine designed to pump against 1000 feet head with 150 pounds steam pressure.

Single Cylinder Piston Pattern Pumps

(Patented)

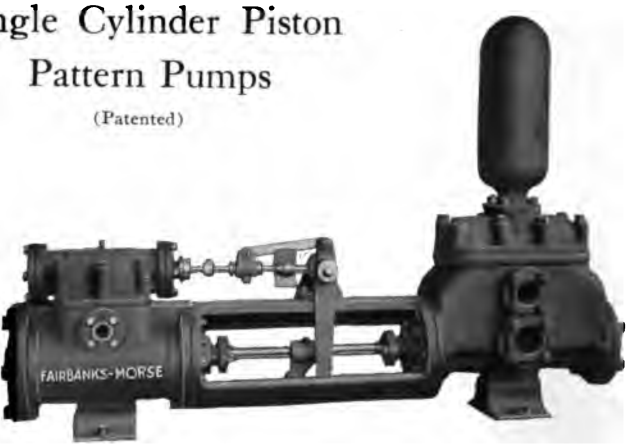


Fig. 384—Size 6x4x8.

We wish to call attention particularly to the steam valve mechanism used on our single cylinder pumps. It is positive in operation, contains a minimum number of parts and is so simple in design that the adjustment presents no difficulties to the pump attendant.

Within the steam chest there is a piston valve, fitted with snap rings, which operates a flat slide valve to reverse the movement of the main piston.

The valve rod is rigidly connected to the main valve and all of the parts which require adjustment are outside of the steam chest, where they can be easily reached.

There is an appreciable proportion of the pump using public who prefer pumps of the single cylinder type and to such we offer our line of single cylinder machines, with full confidence that they will meet the most exacting demands with unqualified satisfaction.

FOR 150 POUNDS WATER PRESSURE

Size			Gallons per Stroke	Piston Travel, in feet, per Minute Conservative Rating	Gallons per Minute at Rated Speed	Size of Pipes				Floor Space, Inches	Telegraphic Code Word
Diameter of Steam Cylinder, Inches	Diameter of Water Cylinder, Inches	Length of Stroke, Inches				Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe		
4½	2½	5	.11	50	12.7	½	¾	1¼	1	37x 8	Pelab
4½	3	5	.15	50	18.3	½	¾	1½	1	37x 8	Pelba
6	4	8	.43	65	42	¾	1	2	1½	54x12	Pelcd
7	4½	8	.55	65	53	1	1½	2½	2	55x12	Peldc
8	5	12	1.02	85	86	1	1½	3	2½	69x14	Pelef
10	6	12	1.47	85	124	1½	2	4	3	75x16	Pelfe

LOW SERVICE PUMPS FOR 75 POUNDS WATER PRESSURE

Size			Gallons per Stroke	Piston Travel, in feet, per Minute Conservative Rating	Gallons per Minute at Rated Speed	Size of Pipes				Floor Space, Inches	Telegraphic Code Word
Diameter of Steam Cylinder, Inches	Diameter of Water Cylinder, Inches	Length of Stroke, Inches				Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe		
4½	4	5	.27	50	32.6	½	¾	2	1½	40x11	Pelgh
6	5	8	.68	65	66	¾	1	3	2½	55x14	Pelhg
6	6	8	.97	65	94	¾	1	4	3	55x14	Pelij
7	5	8	.68	65	66	1	1½	3	2½	59x15	Peljx
7	6	8	.97	65	94	1	1½	4	3	60x16	Pelkm
7	7	8	1.33	65	130	1	1½	5	4	61x16	Pelmk
8	6	12	1.47	85	124	1	1½	4	3	69x16	Pelny
8	7	12	2.00	85	170	1	1½	5	4	73x18	Pelop
8	8	12	2.61	85	221	1	1½	5	4	73x18	Pelpa
8	10	12	4.08	85	346	1	1½	6	5	75x20	Pelqr

See Notes 1 and 2, page 137, concerning capacities.

Direct Acting Vacuum Pumps

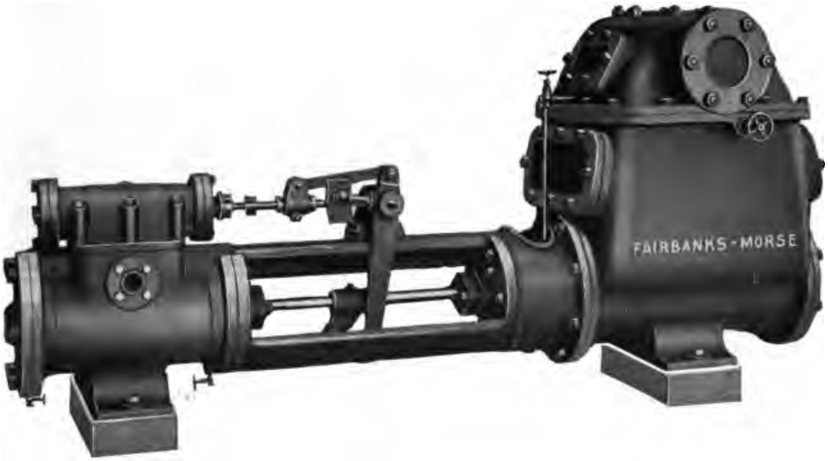


Fig. 385—Size 8x10x12.

To meet the exacting requirements of an efficient vacuum pump, we offer the machine shown by Fig. 385.

The steam mechanism is positive in operation and the design of the vacuum cylinder is such as will maintain steadily a high vacuum.

A submerged stuffing box on the vacuum cylinder end of the piston rod prevents air from leaking into the cylinder around the rod and vitiating the vacuum.

These pumps are intended for use in connection with evaporating effects for either the wet or dry system. Also in sugar refineries, chemical works, dye works, heating systems, surface condensers, keel condensers, etc.

Diameter of Steam Cylinder, Inches	Diam. of Vacuum Cylinder, Inches	Length of Stroke, Inches	Cubic Feet per Stroke	Square Feet of Radiation Will Drain	Steam Pipe, Inches	Exhaust Pipe, Inches	Suction Pipe, Inches	Discharge Pipe, Inches	Floor Space, Inches	Telegraphic Code Word
3½	5	5	.05	5,000	½	¾	3	3	44x16	Pelhi
4½	6	7	.11	7,500	½	¾	3	3	52x17	Pelih
6	8	12	.34	22,000	¾	1	4	4	75x19	Peljk
6	10	12	.54	35,000	¾	1	6	6	80x26	Pelkj
8	10	12	.54	35,000	1	1½	6	6	80x24	Pelml
8	12	12	.78	50,000	1	1½	6	6	82x26	Pelno
8	14	12	1.07	60,000	1	1½	8	8	82x31	Pelon
10	12	18	1.17	65,000	1½	2	6	6	103x26	Pelpr
10	14	18	1.60	80,000	1½	2	8	8	103x27	Pelrp
12	14	18	1.60	80,000	2	2½	8	8	105x27	Pelst
10	16	18	2.09	100,000	1½	2	8	8	106x30	Pelts
12	16	18	2.09	....	2	2½	8	8	107x30	Pelvu
12	18	18	2.65	....	2	2½	8	8	116x40	Pelyx
14	18	24	3.53	....	2	2½	10	10	132x41	Pelxy
12	20	24	4.36	....	2	2½	10	10	134x44	Pelza
14	20	24	4.36	....	2	2½	10	10	134x41	Pemab
14	22	24	5.27	....	2	2½	12	12	134x41	Pemba
16	24	24	6.27	....	2	2½	12	12	144x45	Pemcd
16	26	24	7.37	....	2	2½	14	14	150x46	Pemdc
16	28	24	8.55	....	2	2½	16	14	150x46	Pemef

Independent Condensing Apparatus

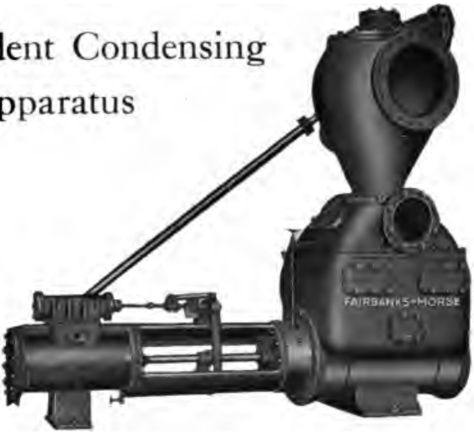


Fig. 386—Size 14x20x24.

The office of a condenser when used in connection with a steam engine is to remove the atmospheric pressure from the exhaust side of the engine piston and either increase the power developed by the engine or enable the engine to develop a given power with less expenditure of steam.

The machine shown above is simple in design, yet embodies all necessary features to render it positive and durable in operation.

The saving in steam effected by the use of an efficient condensing apparatus varies from 15 to 40%, depending upon the conditions.

Correspondents should give complete information on the following questions:

1. What is the type of engine; simple, compound or triple expansion?
2. How many pounds of steam are to be condensed per hour? Or state diameter of engine cylinder, length of stroke, revolutions per minute, and maximum cut off.
3. What is the steam pressure carried?
4. What is the maximum temperature of injection water?
5. What are the distances both vertically and horizontally from surface of injection supply to floor of room where condenser is to be located?

When desired, we can furnish these machines with compound steam ends.

Diameter of Steam Cylinder, Inches	Diameter of Water Cylinder, Inches	Length of Stroke, Inches	Pound of Steam Will Condense per Hour with 70° Cooling Water 26-inch Vacuum	Cooling Water Required Gallons per Minute 70° Temp.	Sizes of Pipe for Short Lengths, Inches					Approximate Dimensions, Ins.			Telegraphic Code Word
					Steam	Exhaust	Engine Exhaust Opening	Injection	Discharge	Length	Width	Height	
3½	5	5	290	14½	½	¾	3	3	3	44	18	43	Pemfe
4½	6	7	689	34½	½	¾	4	2½	3	52	18	43½	Pida
6	8	12	1839	92	¾	1	5	4	4	75	23	54½	Pemgh
6	10	12	2981	150	¾	1	6	4	6	80	28	66	Pemik
8	10	12	2981	150	1	1½	6	4	6	80	28	66	Pemki
8	12	12	4154	208	1	1½	8	5	6	82	32	70	Pemol
8	14	12	5500	275	1	1½	10	6	10	82	34	72	Pemlo
10	12	18	4696	232	1½	2	8	5	6	103	32	76	Pempt
10	14	18	6411	320	1½	2	10	6	8	103	40	82	Pemts
12	14	18	6411	320	2	2½	10	6	8	105	40	82	Pemst
10	16	18	8221	410	1½	2	10	6	8	106	40	86	Pemyx
12	16	18	8221	410	2	2½	10	6	8	107	40	86	Pepab
12	18	18	10610	528	2	2½	10	8	10	116	46	104	Pepca
14	18	24	12464	625	2	2½	12	8	10	132	53	122	Pepde
12	20	24	15406	770	2	2½	12	8	10	134	53	122	Pepgh
14	20	24	15406	770	2	2½	12	8	10	134	53	122	Pephi
14	22	24	18716	932	2	2½	14	8	12	134	53	122	Pepko
16	24	24	22198	1105	2	2½	14	8	12	144	54	127	Peprs
16	26	24	26078	1300	2	2½	14	8	12	150	60	148	Pepst
16	28	24	30258	1520	2	2½	14	8	12	150	60	148	Pepxz

See Notes 1 and 2, page 137, concerning capacities.

Artesian Well Engines

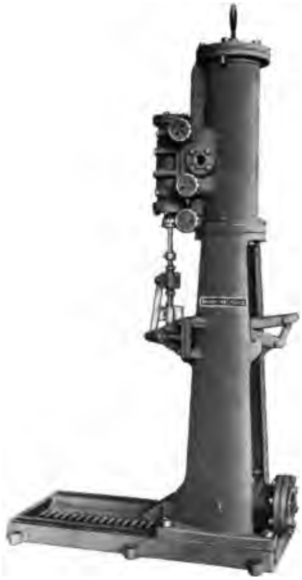


Fig. 387—Size 8x24.

Our line of artesian well engines are all of the same general design as shown by Fig. 387, above.

The engine is carried on a heavy cast-iron base, designed for being bolted to foundation over the well. Base is fitted with a discharge connection independent of the engine framing so that when it is necessary to move the engine back from the well in order to pull the pump pistons for examination or renewal of leathers, this can be attended to more quickly and with less expense than with cheaper built machines.

Our engines are regularly fitted with displacement plungers in order to secure a steady and uniform discharge.

The engines are provided with three-cushion or regulating valves—two of these valves being arranged in the steam ports and the third in the lower exhaust port. By properly adjusting these valves, the engines will operate quietly and cushion easily even at high speed.

Size of Engine		Size of Pipes, Inches			Largest Size Displacement Plunger, Inches	Floor Space, Inches	Telegraphic Code Word
Diameter of Steam Cylinder, Inches	Length of Stroke, Inches	Largest Size Drop Pipe	Steam	Exhaust			
6	18	6	1	1½	3½	42x20	Pibxy
6	36	6	1	1½	3½	42x20	Pibed
8	24	8	1¼	1½	4	51x26	Pibgh
8	36	8	1¼	1½	4	51x26	Pibih
10	36	10	1½	2	6½	61x31	Pibmo
12	36	10	1½	2	6½	61x31	Pibon
14	36	10	2	3	6½	67x36	Pibus
16	36	12	2	3	8	67x36	Pibtu

Please be sure to advise size of drop pipe *and pin connection,* and also size of working barrel which the engine is to operate, so that we may furnish a displacement plunger of proper size to correspond with the working barrel.

Duplex Piston Pattern Power Pumps

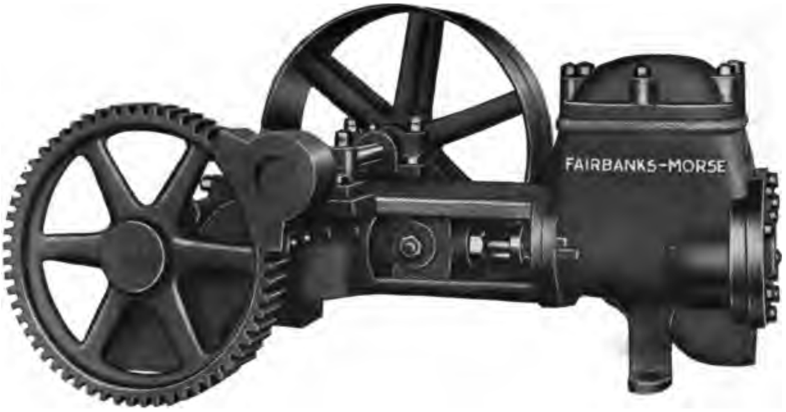


Fig. 388—Illustrating sizes 2½x4 to 6x10, inclusive, Duplex Piston Pattern Power Pumps.

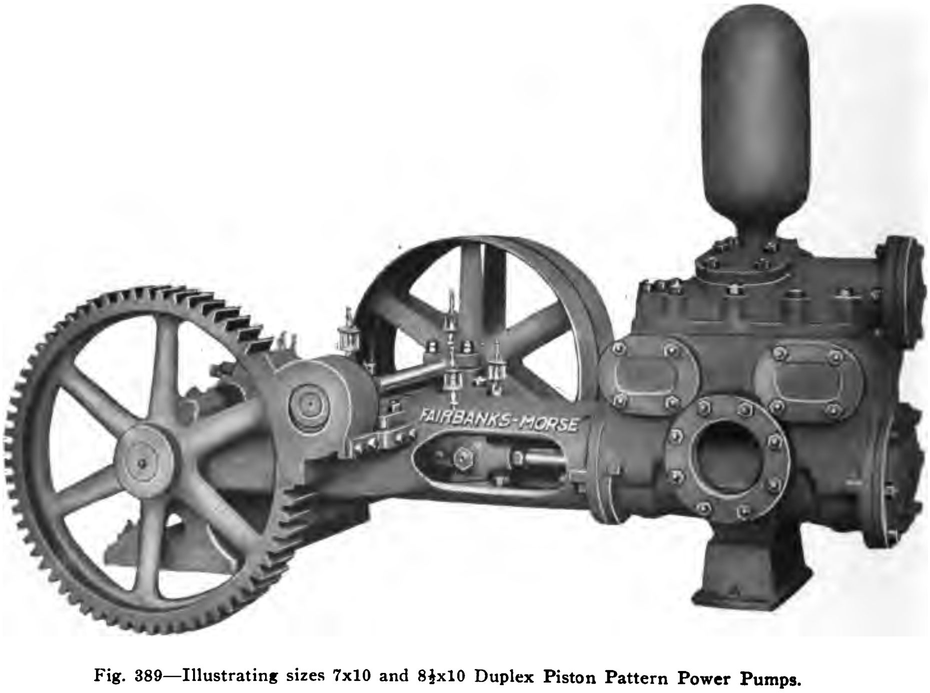


Fig. 389—Illustrating sizes 7x10 and 8½x10 Duplex Piston Pattern Power Pumps.

Duplex Piston Pattern Power Pumps

These are rugged, substantially built Duplex Power Pumps, designed to operate against higher elevations than the ordinary single cylinder double acting pumps. They are good for pressures of from 60 to 150 pounds, according to size of pump. (See table.)

Can be belted or direct connected to gas and gasoline engines, electric motors, or counter shaft.

The water boxes are of the same design as our Duplex Steam Pumps. The power end is of particularly strong design, both frames being in a single casting giving maximum strength and rigidity. The moving parts are all adjustable for wear; the gearing is of charcoal iron, machine cut, and every pump is carefully tested before shipment.

Size of Pump			Capacity			Pipe Sizes for Short Lengths			Pulleys, Inches			
Diam. of Water Cylinders, Ins.	Length of Stroke, Inches	Maximum Water Pressure, Pounds	Gallons per Revolution	Revolutions per Minute	Gallons per Minute	Suction, Inches	Discharge, Inches	Ratio of Gearing	Diameter of Tight and Loose	Width of Belt	Floor Space in Inches	Telegraphic Code Word
2½	4	140	.27	50 to 75	13 to 20	2	1½	5 to 1	14	3	36x28	Pilab
*3	4	140	.48	50 to 75	24 to 36	2	1½	5 to 1	14	3	36x28	Pilec
3¾	4	80	.76	50 to 75	38 to 56	2½	2	5 to 1	14	3	40x28½	Pilid
*3½	6	150	.97	40 to 60	38 to 58	2½	2	5 to 1	24	4	52x37	Pilaf
*4	6	140	1.32	40 to 60	53 to 79	3	2	5 to 1	24	4	52x37	Pilug
*5	6	90	2.04	40 to 60	81 to 120	4	3	5 to 1	24	4	52x37	Puxat
5¾	6	65	2.68	40 to 60	107 to 160	4	3	5 to 1	24	4	56x37	Puxoy
6	6	60	2.92	40 to 60	117 to 175	4	3	5 to 1	24	4	56x37	Puxen
*4½	10	150	2.76	40 to 50	110 to 138	4	3	5 to 1	28	6	80x50	Pillage
*5	10	140	3.40	40 to 50	136 to 170	4	3	5 to 1	28	6	80x50	Puvab
*6	10	80	4.88	40 to 50	195 to 244	5	4	5 to 1	28	6	81x50	Puved
7	10	60	6.66	40 to 50	266 to 333	6	5	5 to 1	28	6	84x50	Puvig
8½	10	50	9.84	40 to 50	393 to 492	6	5	5 to 1	28	6	84x50	Puvej

For list of pumps of larger capacities, see following page.

Pulleys are of proper size to operate pumps with single belt.

*These pumps have suction opening on the end. Other sizes have suction opening on side.

Duplex Plunger and Ring Pattern Power Pumps

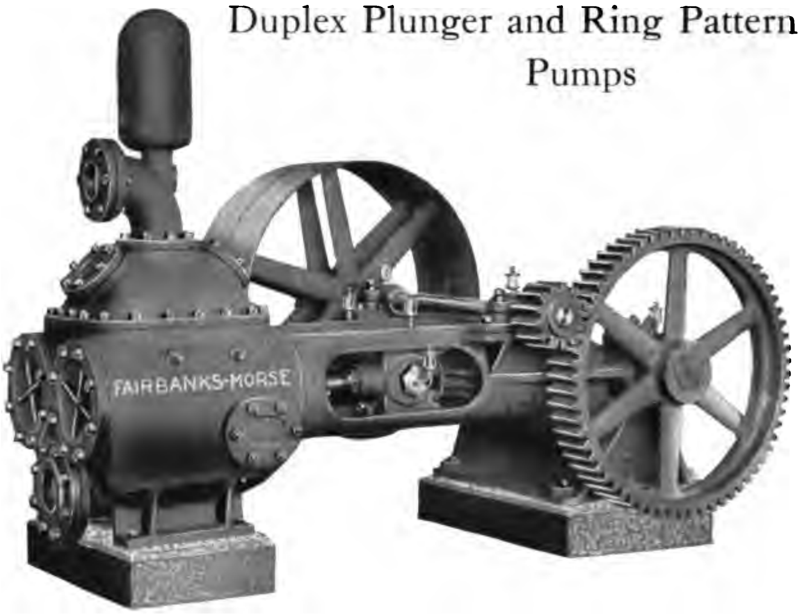


Fig. 390—Illustrating sizes 6x10 to 8½x10, inclusive.

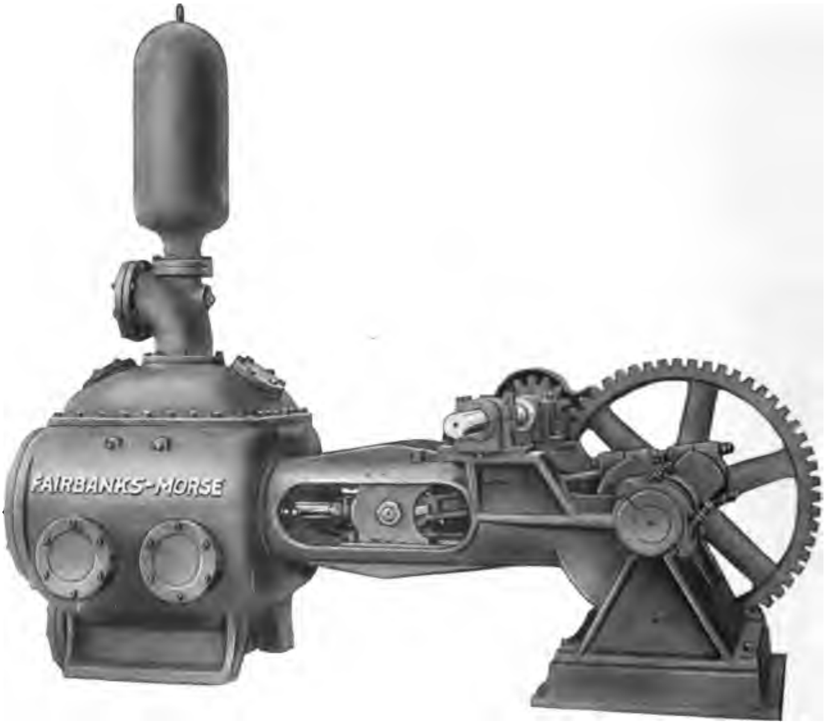


Fig. 391—Illustrating sizes 8x12 to 14x12, inclusive.

Duplex Plunger and Ring Pattern Power Pumps

Our Plunger and Ring Pattern Power Pumps are illustrated by Figs. 390 and 391, which show pumps strongly and substantially designed with a rigid power end. All parts of this machine are easy of access for examination or adjustment.

Pump fitted with packed pistons or with solid plungers as ordered. The cross heads have adjustable shoes; the connecting rods have adjustable boxes; the gearing is of charcoal iron, with teeth accurately machine cut. Every pump is carefully tested before shipment.

Size of Pump			Capacity			Pipe Sizes for Short Lengths			Pulleys, Inches			
Diam. of Water Cylinders, Ins.	Length of Stroke, Inches	Maximum Water Pressure, Pounds	Gallons per Revolution	Revolutions per Minute	Gallons per Minute	Suction, Inches	Discharge, Inches	Ratio of Gearing	Diameter of Tight and Loose	Width of Belt	Floor Space in Inches	Telegraphic Code Word
6	10	150	4.88	40 to 50	195 to 245	5	4	5 to 1	40	8	94x65	Puvak
7	10	140	6.66	40 to 50	266 to 334	6	5	5 to 1	40	8	94x65	Puvom
8	10	100	8.70	40 to 50	348 to 435	6	5	5 to 1	40	8	94x65	Puvip
8½	10	90	9.84	40 to 50	393 to 492	6	5	5 to 1	40	8	94x65	Puvra
8	12	140	10.44	40 to 50	417 to 522	6	5	Varies according to service	Pulleys when required are furnished at extra cost		108x70	Puvar
8½	12	125	11.76	40 to 50	469 to 588	7	6				108x70	Puvot
9	12	105	13.20	40 to 50	528 to 660	7	6				111x70	Puvto
10	12	85	16.32	40 to 50	652 to 816	8	7				111x70	Qubad
10½	12	80	18.00	40 to 50	720 to 900	8	7				111x70	Qubeb
12	12	60	23.48	40 to 50	939 to 1174	10	8				124x70	Qubcg
10	12	150	16.32	40 to 50	652 to 816	8	7				127x82	Qubih
10½	12	135	18.00	40 to 50	720 to 900	8	7				128x82	Qubag
11	12	120	19.74	40 to 50	789 to 987	10	8				128x82	Qubok
12	12	100	23.48	40 to 50	939 to 1174	10	8				129x82	Qubno
14	12	75	32.00	40 to 50	1280 to 1600	12	10				130x82	Qubop
16	18	....	62.64	33⅓	2087	14	12				....	Qubut
18	18	....	79.24	33⅓	2641	16	12				....	Qubty
18	24	....	.....	25	2641	16	12				....	Qubij
20	24	....	.....	25	3262	18	14				....	Qubox

For list of pumps of smaller capacities, see preceding page.

Pulleys are of proper size to operate pumps with single belt.

Duplex Center Packed Plunger Pattern Power Pumps

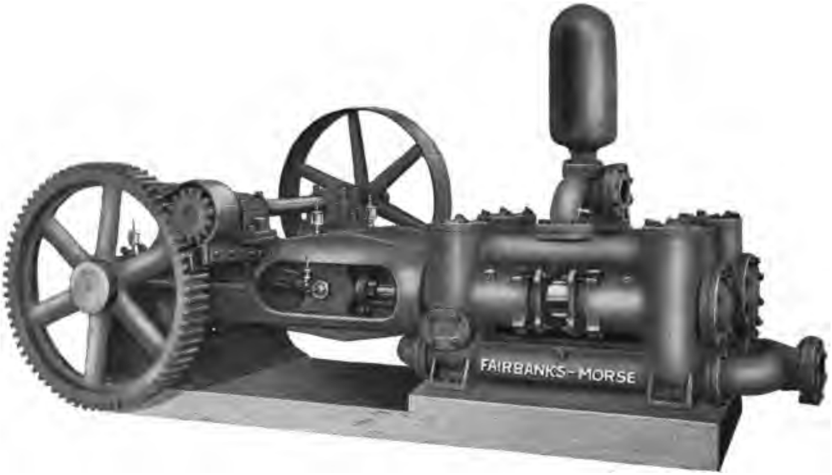


Fig. 392—Size 8x12.

These pumps are designed for water works service, or mine work, or any situation where on account of the pressure or the nature of the work an outside packed plunger type of pump is preferred.

Diam. of Water Cylinders, Ins.	Length of Stroke, Inches	Maximum Water Pressure, Pounds	Capacity			Pipe Sizes for Short Lengths			Pulleys, Inches			
			Gallons per Revolution	Revolutions per Minute	Gallons per Minute	Suction, Inches	Discharge, Inches	Ratio of Gearing	Diam. of Tight and Loose	Width of Belt	Floor Space in Inches	Telegraphic Code Word
*5	10	125	3.40	40 to 50	136-170	4	3	5 to 1	28	6	99x61	Pomene
5	10	200	3.40	40 to 50	136-170	4	3	5 to 1	40	8	110x65	Qabad
*6	10	140	4.88	40 to 50	195-244	5	4	5 to 1	40	8	115x65	Qadab
7	10	120	6.66	40 to 50	266-333	6	5	5 to 1	40	8	132x65	Qafeg
6	12	225	5.84	40 to 50	233-292	6	5	5 to 1	Pulleys where required are furnished at extra cost		148x68	Qahig
7	12	175	8.00	40 to 50	320-400	6	5	5 to 1			148x68	Qagef
8	12	125	10.44	40 to 50	417-522	6	5	5 to 1			154x72	Qahok
10	12	75	16.32	40 to 50	652-816	8	7	5 to 1			156x72	Qakoh
12	12	50	23.48	40 to 50	939-1174	10	8	5 to 1			168x72	Qamot
8	12	200	10.44	40 to 50	417-522	6	5	5 to 1			160x82	Qatom
10	12	125	16.32	40 to 50	652-816	8	7	5 to 1			168x82	Qabox
12	12	100	23.48	40 to 50	939-1174	10	8	5 to 1			180x82	Qamux
14	12	70	32.00	40 to 50	1280-1600	12	10	5 to 1			192x82	Qatuy

Pulleys are of proper size to operate pumps with single belts.

*These two sizes have pump end similar in general design to Fig. 364 on page 158.

Duplex Center Packed Plunger Pattern Power Pumps

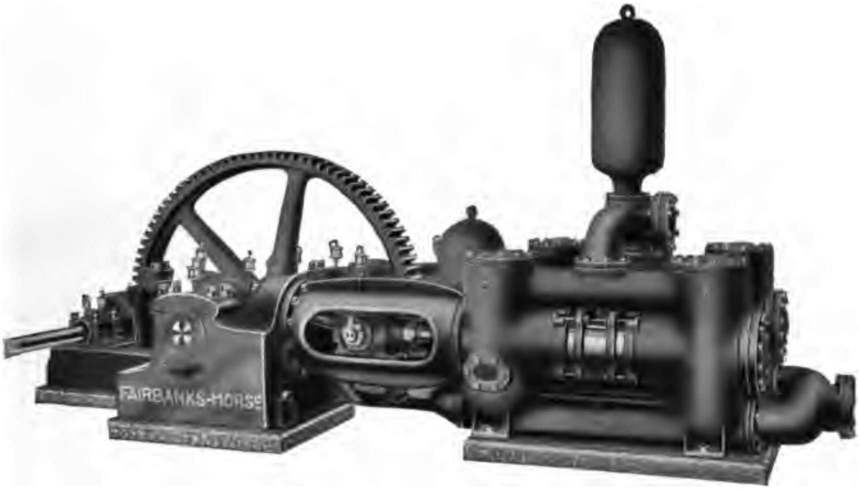


Fig. 393—Size 10x12.

In this design the power end is of exceptionally rugged proportions, with crank shaft bearings, four in number, of quarter box design, arranged in pillow block castings. The pump end is of our standard center packed plunger construction.

Diameter of Water Cylinder, Inches	Length of Stroke, Inches	Maximum Water Pressure, Pounds	Capacity			Pipe Size for Short Lengths		Telegraphic Code Word
			Gallons per Revolution	Revolution per Minute	Gallons per Minute	Suction Pipe	Discharge Pipe	
10	12	250	16.32	40 to 50	652 to 816	8	7	Qibed
12	12	175	23.48	40 to 50	939 to 1174	10	8	Qideb
14	12	125	32.00	40 to 50	1280 to 1600	12	10	Qibox
10	18	250	24.48	33⅓	816	8	7	Qibat
12	18	175	35.22	33⅓	1174	10	8	Qicat
14	18	125	48.00	33⅓	1600	12	10	Qidog
15	18	110	55.04	33⅓	1830	12	10	Qimag
16	18	95	62.00	33⅓	2067	14	12	Qimud
14	24	...	64.00	25	1600	12	10	Qican
16	24	...	83.52	25	2067	14	12	Qihog

Duplex Heavy Pressure Power Pumps

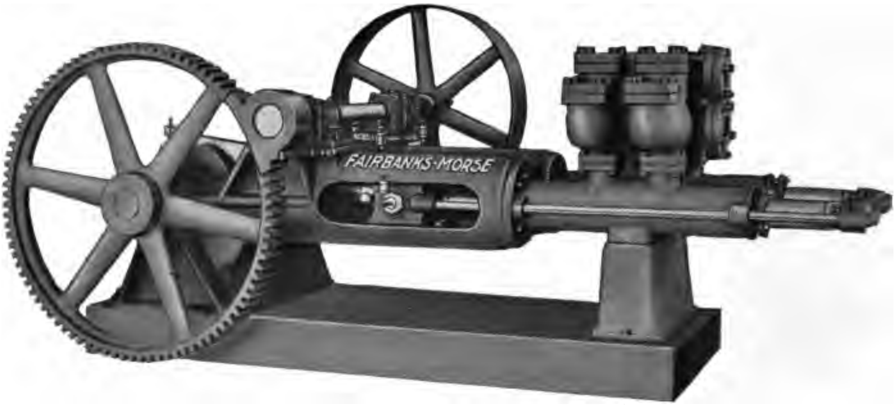


Fig. 394—Size 4¼x12 —Illustrating a Duplex Valve Pot Power Pump. The pumps are designed for working pressure up to 1000 pounds per square inch. The valve pots are interchangeable and the valves are usually made of bronze with beveled or leather faces, and guided by wings, from below.

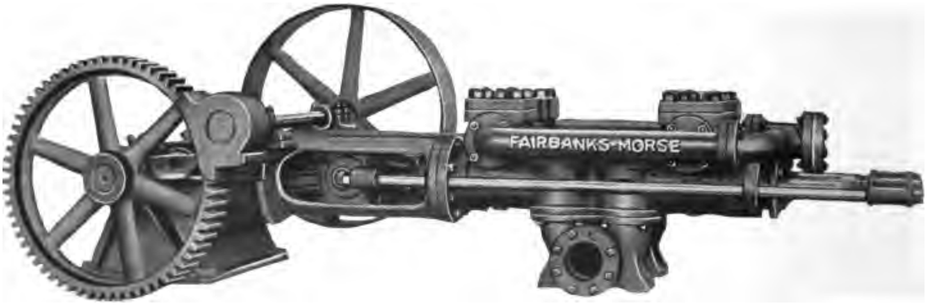


Fig. 395—Size 3x10 —Illustrating a "Coalinga" Pattern Power Pump. These machines are designed primarily for handling heavy gravity crude oil and the pump ends are of the design described on page 167. They are built for a working pressure of 750 pounds per square inch.

Duplex Heavy Pressure Power Pumps

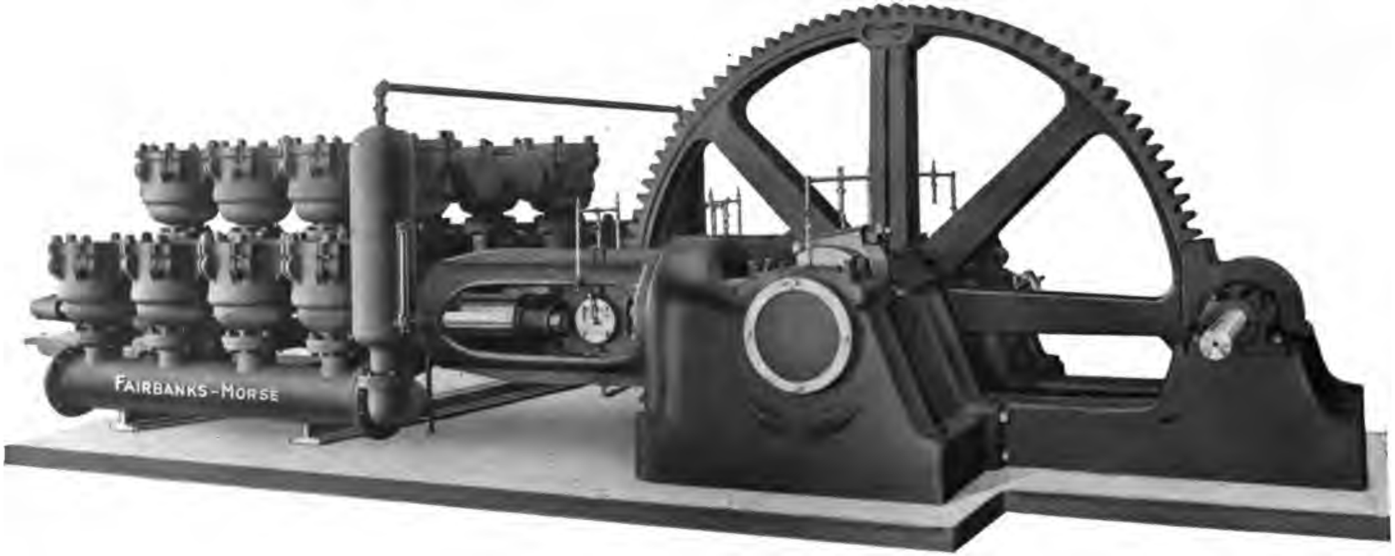


Fig. 396—Illustrating 18-inch Stroke Valve Pot Power Pump for pressures of from 500 to 1000 lbs.

Heavy Pressure Power Pumps

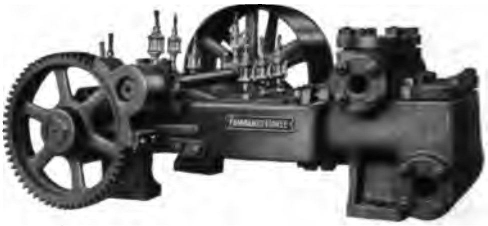


Fig. 397—2x4 Horizontal Triplex Pump.

There are numerous situations where a small amount of water must be pumped against a high head, and the following pumps have been designed for this purpose. These pumps are all of the horizontal, triplex, single-acting, plunger type, with cranks spaced 120 degrees apart.

The plungers work through externally packed stuffing boxes, so arranged that same can be adjusted or re-packed easily. The plunger crossheads work in cylindrical guides bored in the frames, insuring permanent and accurate alignment of the moving parts. The connecting rods are made from forgings, with crosshead ends brass bushed and crank shaft ends lined with babbitt. The crank shaft is made from a steel casting; bearings lined with babbitt. The water valves are made of brass, of the wing guided type, seating on brass seats pressed into the pump decks with a taper fit.

Fig. 398 shows one of these pumps directly connected to a Fairbanks-Morse vertical gasoline engine, so arranged that by sliding the gear on the engine shaft the pump can be disconnected and the engine used for driving other machinery.

Diameter of Water Cylinder, Inches	Length Stroke, Inches	Gallons per Revolution	Revolutions per Minute	Gallons per Minute	Pressure, Pounds	Pize Sizes		Tight and Loose Pulleys	Ratio of Gearing	Floor Space in Inches			Telegraphic Code Word
						Suction	Discharge			Length	Width	Height	
2	4	.16	60	9.6	400	1½	1¼	14x3	5 to 1	54	32	14	Qiman
2½	4	.25	60	15.	400	2	1¼	14x3	5 to 1	58	32	14	Qimox
3	4	.37	60	22.	400	2	1½	16x4	5 to 1	62	33	16	Qitac

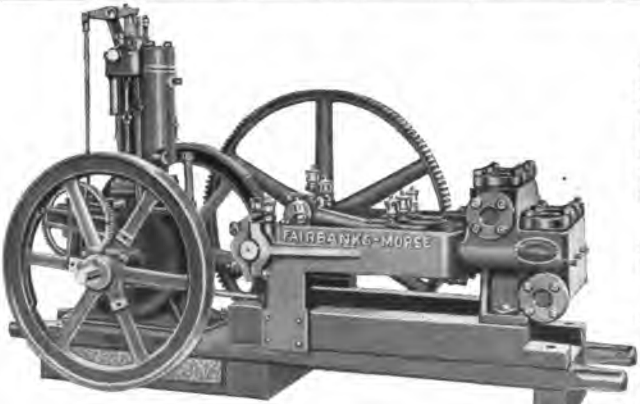


Fig. 398—2 H. P. Type "T" Gasoline Engine Outfit No. 275.

These engines are regularly fitted for Gasoline (Petrol), Naphtha, or Distillate, but they can also be equipped to operate on Kerosene, Alcohol, or Gas, when so ordered.

Gasoline engine will always be shipped unless otherwise ordered.

Send for special literature showing many other combinations of our Oil and Gas Engine with power pumps, in sizes up to 500 H. P.

Outfit No. Engine and Pump Complete	Vertical Engine						Triplex Pump							**Floor Space Complete, Inches	Height Over All, Inches	Shipping Weight Complete, Pounds
	Actual H. P.	Speed, R. P. M.	Pulley, Inches	Fly Wheels, Inches	Gasoline Tank, Gallons	Water Tank, Gallons	Cylinder, Inches	Stroke, Inches	Speed, R. P. M.	Pipe Sizes Short Length		Capacity				
										Suction, Inches	Disch'ge, Inches	Gallons per Revolution	Gallons per Minute	Pressure, Pounds			
275	2	400	8x 4	24x1¾	2	26	2	4	60	1½	1¼	0.16	9.7	200	70x33	42	1050
290	2	400	8x 4	24x1¾	2	5	2	4	60	1½	1¼	0.16	9.7	200	60x33	49	1050
282	3	350	10x 5	28x2¼	7	55	2	4	60	1½	1¼	0.16	9.7	200	81x37	52	1475
283	3	350	10x 5	28x2¼	7	5	2	4	60	1½	1¼	0.16	9.7	200	63x37	58	1475
284	4	350	12x 6	28x2¼	7	55	2½	4	60	2	1½	0.25	15.3	200	83x40	52	1650
285	4	350	12x 6	28x2¼	7	5	2½	4	60	2	1½	0.25	15.3	200	65x40	58	1650
286	6	350	16x10	41x2½	15	110	3	4	60	2	1½	0.37	22.	200	96x48	60	2400
287	6	350	16x10	41x2½	15	10	3	4	60	2	1½	0.37	22.	200	72x48	68	2400

**Floor space includes starter crank space required.

Piston Pattern Power Pumps

A Horizontal Double-Acting Triplex Power Pump, with water boxes in separate castings, of the submerged piston type. It will be noticed that the arrangement of the power end is of a design which possesses maximum strength, and as the frames are all carried on a single piece cast iron bed-plate, all of the running gear is held in alignment, insuring durability and quiet operation.

Gearing is machine cut; crossheads are made with adjustable slippers for both top and bottom faces and the cross-heads operate in cylindrical guides. Crank shaft and connecting rods are made from steel castings, and connecting rods are provided with adjustable boxes at both ends.

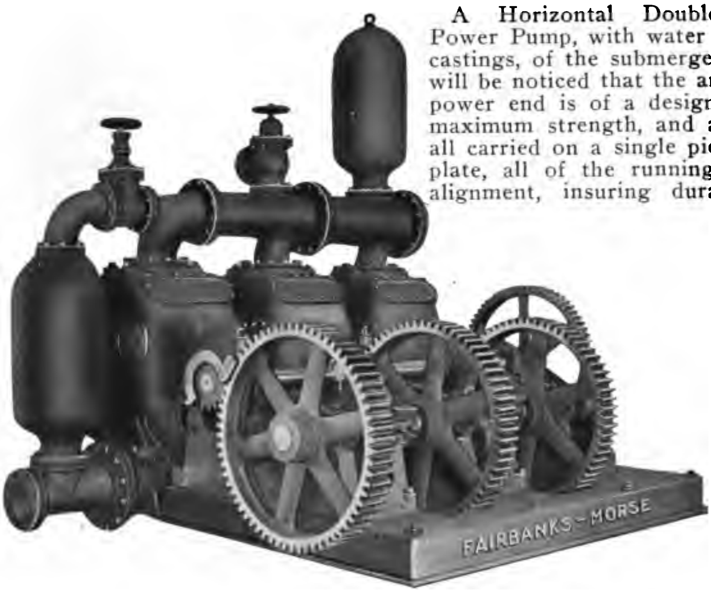


Fig. 399—Illustrating size 14x12.

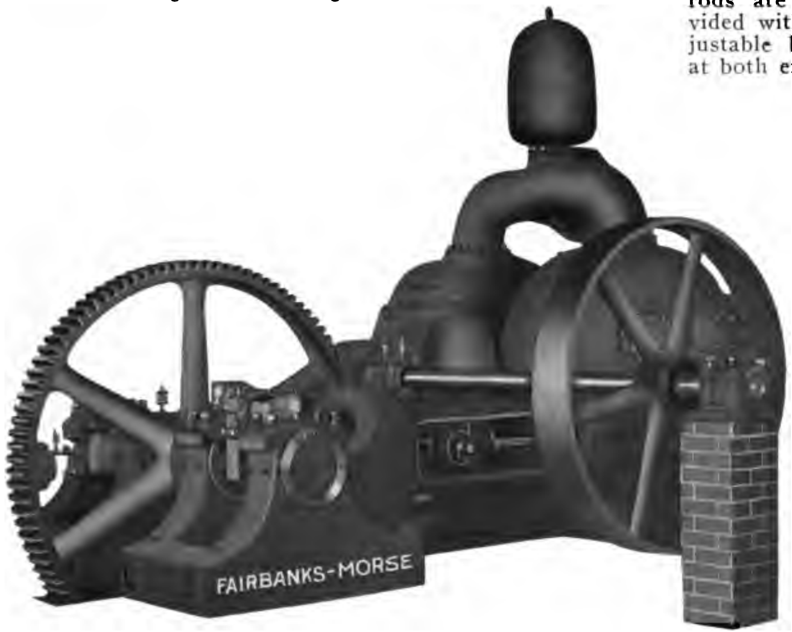


Fig. 400—Size 18x18 —Illustrating a Duplex Piston Pattern Power Pump with water boxes in separate castings.

Machines of the above types are adapted for water works, tank service, or for handling liquids against moderate heads, and are well suited for use with our Gas and Gasoline Engines and Electric Motors.

Prices and complete specifications will be sent on application.

Duplex Power Pumps with "Underwriter" Water End

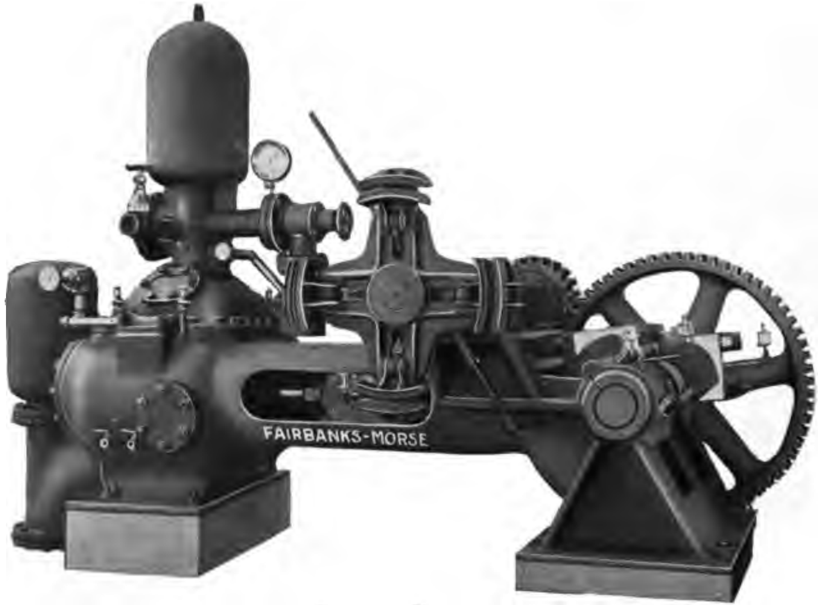


Fig. 401—Size 7x12.
Showing pump with friction clutch coupling arranged for direct connection to gasoline or steam engine.

SINGLE CYLINDER—DOUBLE ACTING POWER PUMPS

The pump illustrated and referred to as the "Typhoon" pump is a new single cylinder double-acting power pump, brought out to meet the demands of the trade for a small, serviceable pump of moderate capacity and pressure.

The cylinder is lined with brass tubing. The piston rod is of steel, brass covered. The valve seats are of brass, screwed into the decks. The valves are of rubber, held in position with brass guards and controlled by cylindrical springs. All gearing is machine cut. The valves can be quickly reached by loosening two nuts which hold the yokes that secure the valve covers in position. All parts are heavy and substantial and designed for durability.

These pumps can be operated by gasoline engines or electric motors or from line shaft.

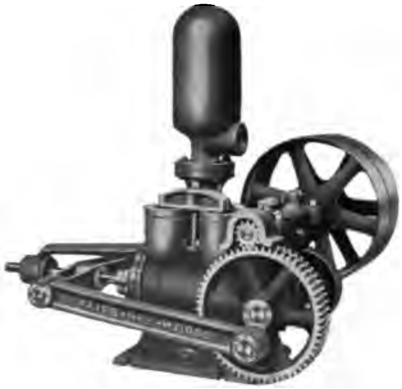


Fig. 402—The Typhoon Pump.

Outfit Number	Pump Trade Name	Speed, R. P. M.	Cylinder, Inches	Stroke, Inches	Maximum Pressure, Pounds	Capacity		Pipe Sizes Short Length		Tight and Loose Pulleys	Ratio of Gearing	Floor Space, Inches	Height Over All, Inches	Approximate Shipping Weight, Complete, Pounds	Telegraphic Code Word
						Gallons per Revolution	Gallons per Minute	Suction, Inches	Discharge, Inches						
508	Deluge	60	2	3	200	.077	4.75	1	¾	10x2¼	3-1	27x16	22	120	Nacre
509	Typhoon Jr.	40	3	5	80	.306	12.24	1½	1½	12x2¼	5-1	39x22	33¾	250	Naid
468	Typhoon	40	5	5	80	.828	33.00	2	2	16x4	5-1	43x30½	35½	480	Naive

Small Duplex Electrically Driven Power Pumps for Mine Service

In many situations where but a comparatively small amount of water is to be pumped and where electric current is available, small duplex power pumps can be furnished and arranged as shown below. These cuts indicate clearly the low head room required.

In mines where the water is bad and contains sulphuric acid in solution, or other chemical impurities, pumps must be fitted with acid metal linings, valve seats and guards, and in some cases the entire pump end must be made of acid resisting metal.

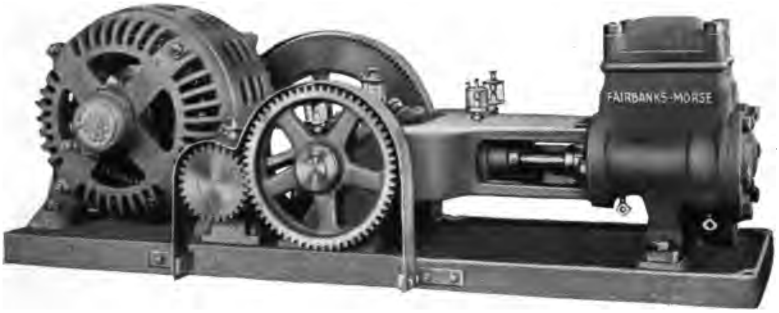


Fig. 403—Size 3¾x4.

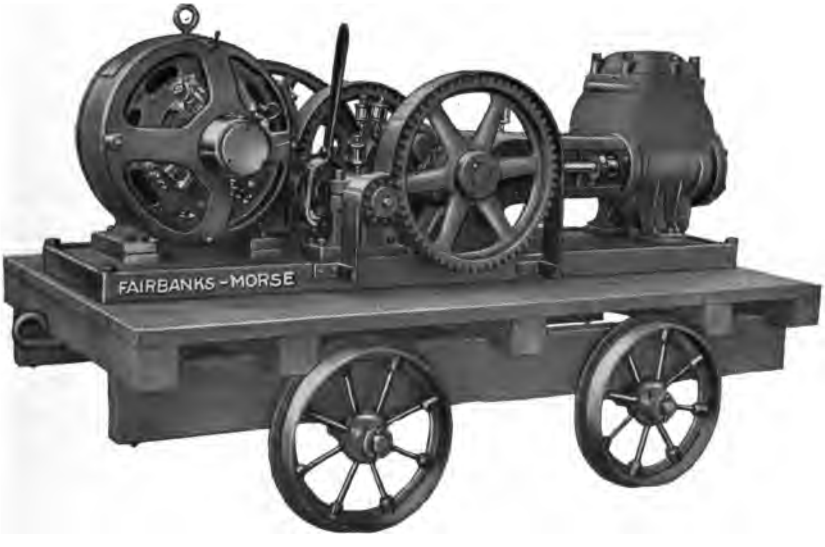
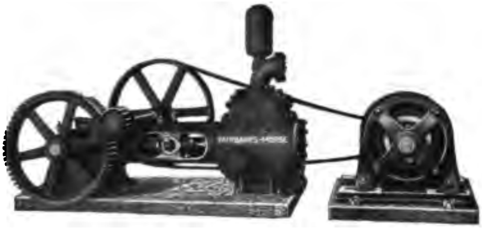


Fig. 404—Size 5x6.

Pump mounted on truck and fitted with gearing arranged to give two speeds to the pump without changing speed of motor. See pages 177, 179 and 180 for list of sizes of duplex power pumps.

Driving Connections for Horizontal Duplex Power Pumps Adapted for Fairbanks-Morse Alternating or Direct Current Motors



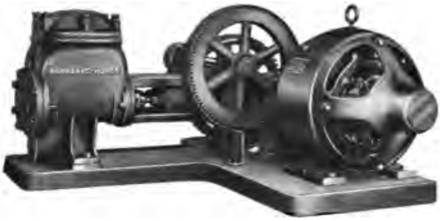
Form "A" (Code Word, Pikab)
Fig. 405

Form "A"—Pump fitted with single pulley for belt drive from electric motor, steam engine, or line shaft. Can be applied to any type of power pump.

The pump is provided with single reduction of gearing, which makes less noise than a direct-connected pump. Rawhide pump pinion furnished, when specially ordered, at extra cost, which reduces the noise to a minimum.

This is an efficient driving connection and we recommend it where space will permit and where it is not too damp for the belt.

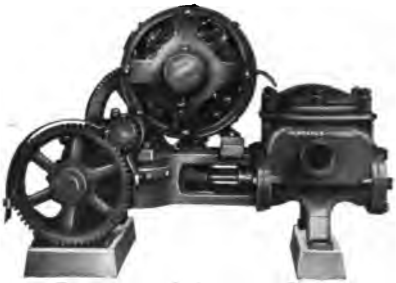
Form "C"—Pump fitted with double reduction of gearing and arranged for direct-connected motor—both pump and motor mounted on the same bed-plate.



Form "C" (Code Word, Pikdf)
Fig. 407

With Form "B," Form "C," and Form "D," the speed from motor to pump is reduced by a double reduction of gearing. We recommend for locations where floor space is limited, or in damp places where a belt drive is not desirable, and where the noise of the gearing is no objection. Rawhide pump and motor pinions furnished, when specially ordered at extra cost.

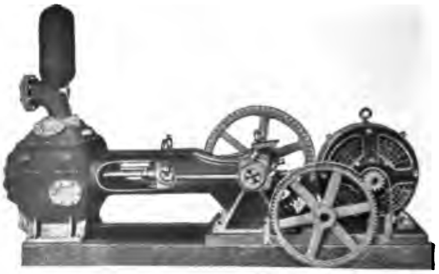
When pump is to be equipped with motor not of our make, we should be furnished with detail motor drawing.



Form "B" (Code Word, Pikec)
Fig. 406

*Form "B"—Pump fitted with double reduction of gearing and arranged for direct-connected motor mounted on top of the pump frame.

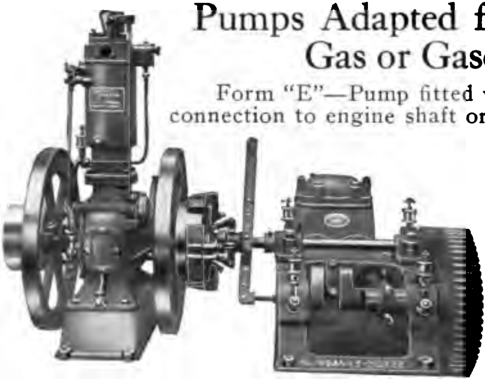
Form "D"—Pump provided with extended bed-plate and a double reduction of gearing for direct-connection to electric motor.



Form "D" (Code Word, Pikgh)
Fig. 408

*It is possible to arrange practically all sizes and types of our Horizontal Power Pumps with the motor placed in position as shown by either Form "A," Form "C," or Form "D." Only in certain cases it is possible to place the motor on the upper portion of the frame, as shown by Form "B," this depending on the size motor for a given pump and the available space on the upper portion of the frame. Price for driving connection does not include motor.

Driving Connections for Horizontal Duplex Power Pumps Adapted for Fairbanks-Morse Gas or Gasoline Engines



Form "E" (Code Word, Pikij)
Fig. 409

Form "E"—Pump fitted with friction clutch coupling for direct connection to engine shaft or line shaft, thus permitting the engine to be started under "no load," and the pump to be operated at will, or the engine used for other purposes. This is a very satisfactory connection for gas or gasoline engines and can be applied to any of our Duplex Power Pumps.

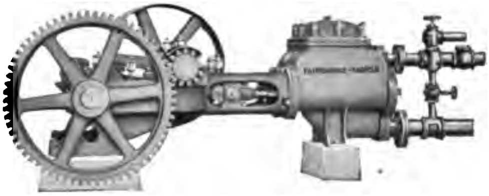
For connection to line shaft, or engine not of our make, order for pump should specify speed of line shaft or engine shaft so that pump gearing can be proportioned accordingly.

We do not regularly furnish bed plate with this driving connection.

Special Connections for Power Pumps Adapted for Boiler Feeding and Intermittent Service

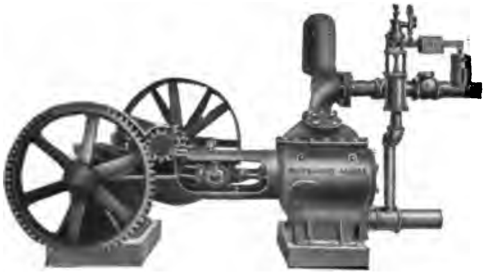
Control "F"—Pump fitted with by-pass, including discharge check valve, and globe valve between suction and discharge. Water relief valve, shown in the cut, is furnished only when specially ordered and at extra cost.

Can be applied to any of our Duplex Power Pumps.



Control "F" (Code Word, Pikmo)
Fig. 410

The speed of the pump usually remains constant. When it is necessary to vary the capacity our Control "F" by-pass can be used. When the globe valve is closed, all of the water is forced through the discharge pipe, the same as with the usual arrangement of piping. When the globe valve is open, the water flows from the discharge to the suction, and thus circulates through the pump. By opening the globe valve more or less, the amount of flow from the discharge pipe can be varied at will. This especially adapts our Duplex Power Pumps for boiler feeding, as by means of our Control "F" the water in the boiler can be maintained at the proper level.



Control "G" (Code Word, Pikom)
Fig. 411

Adapted for Pumps Used in Connection with Hydraulic Elevators, Hydraulic Riveting Machines, Hydraulic Presses, Etc.

Control "G"—Pump fitted with automatic pressure regulator and by-pass. Can be applied to any of our Duplex Power Pumps.

This control can be used when it is desired to maintain a constant discharge pressure while operating the pump at the same speed and when the demand on the pump varies. The discharge pressure is transmitted to a diaphragm in the upper part of the automatic pressure regulator by means of a small pipe. When the maximum pressure is reached, the by-pass valve is opened automatically, and the water then merely circulates through the pump, without flowing through the discharge pipe. The by-pass valve remains open until the discharge pressure falls, when it closes automatically and water is forced through the discharge pipe until the maximum pressure is again reached. The automatic pressure regulator can be adjusted to operate at different pressures as desired.

Air Compressors

In our single stage machines the inlet as well as the discharge valves are of the poppet type.

In our two stage machines the inlet valves are of the semi-rotative or Corliss design, while the discharge valves are of the poppet type—all valves being arranged in the heads.

As all objectionable pockets are eliminated and the clearance reduced to a minimum, high volumetric efficiency is thus secured.

The frames are of heavy construction, of the forked two-bearing type, with the crosshead guides bored cylindrically in same.

The crank shaft bearings are arranged in this frame, are lined with best quality babbitt, hammered in position and scraped to a true fit with the shaft.

Crank shafts and connecting rods are made from steel forgings.

Connecting rods are fitted with babbitt lined crank pin bearings and bronze lined bearings on the wrist pin end—all boxes being made adjustable for wear.

Crossheads are made of cast iron, with adjustable shoes for both top and bottom faces.

The wrist pins are made of steel, carried in the cross-heads with a taper fit and secured in position by a pin with washer and two nuts.

Piston rods are made from machinery steel, turned and polished. They are carried in the crosshead with a straight thread and secured in position with lock nut, which permits quick and easy adjustment of the piston as may be required to suit clearance.

The cylinders and heads are made of hard close-grained cast iron, water jacketed, with water passages so arranged that the water first passes around the valves and through the heads where the heat due to compression is the highest and thence around the cylinder barrel.

In our two stage compressors an inter-cooler is placed beneath the cylinders. The inter-cooler consists of a nest of copper tubes enclosed in a cast iron shell and so arranged that the air is compelled to pass over the tubes in thin streams, insuring intimate contact with the cooled tubes.

The cooling water in our two-stage compressors passes first through the inter-cooler, is then led to the high pressure cylinder and from there to the low pressure cylinder—the arrangement being such that the water is compelled to pass through the various passages in succession, there being no chance to select a path of least resistance, and the method employed is one that can be depended upon to maintain a minimum temperature.

The air pistons are of cast iron, of the box type, fitted with two snap rings.

A great deal of attention has been given to the design and arrangement of valves used in our compressors because the satisfactory operation of the machines depends so largely on these features.

Sufficient valve area is provided to insure the cylinder filling with air at each stroke without wire drawing and hence, reducing to a minimum the power required to operate the compressor.

Beneath each poppet valve there is a bar or grid placed to preclude the possibility of an accident if, for any reason, a valve should become loose which might otherwise project or drop into the cylinder.

All poppet valves seat in removable bronze cases which are flanged and held in position by cast iron plugs screwed into the heads. The arrangement is such that the valves can be reached easily and quickly for examination or re-grinding and when the parts are assembled, a tight joint is insured.

Discharge valves are all made of steel, cup-shaped, insuring strength and lightness and consequent durability.

Poppet valves are made from solid forgings and a split sleeve holds them in position in the bronze case. This sleeve is screwed into the case and held securely in place by a lock nut.

The mechanically operated suction valves used in our two-stage machines are of the semi-rotative or Corliss type, made of cast iron and operated through rod connections from a disc attached to the end of the crank shaft.

The unloading device used on our single stage machines is simple and efficient. The valve body is of a special composition and the piston valve is made of hard bronze and is loaded with an adjustably weighted lever. The unloading is accomplished by lifting the suction valves and thus allowing atmospheric air to circulate between both ends of the air cylinder.

Air Compressors

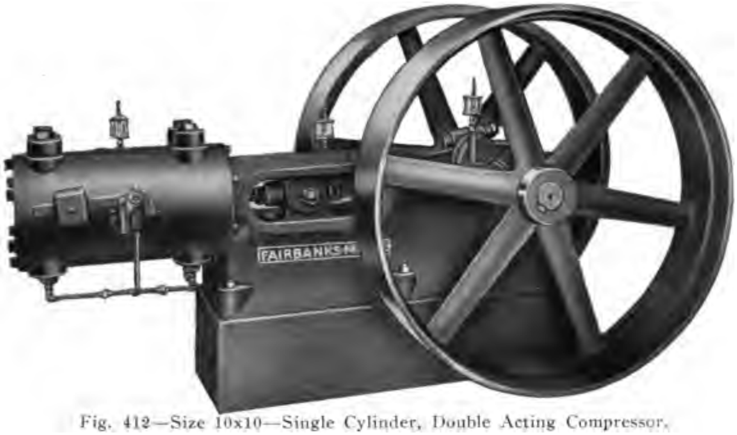


Fig. 412—Size 10x10—Single Cylinder, Double Acting Compressor.

Suction valves are lifted by small brass pistons placed directly beneath them which are actuated by air received through the unloading valve.

In the two-stage machines unloading is accomplished by partially or entirely closing the suction opening with a special valve placed in the suction pipe which can be easily and quickly adjusted for various pressures.

The oiling arrangement provided is simple and efficient and no oil cup is attached directly to a moving part; hence, they can all be refilled or adjusted while the compressor is in motion.

The crosshead pin is oiled from a cup screwed into the frame, the oil passing down through holes drilled in the frame and crosshead to the pin. The crank pin receives oil from a centrifugal oiling ring, the oil cup supplying same being attached to a pedestal bolted to the frame; the air cylinder is tapped and fitted with an adequate size lubricator, and the crank shaft bearings are fitted with grease boxes.

Cylinder Diameter, Inches	Stroke, Inches	Revolutions per Minute	Piston Displacement, Cubic Feet per Minute	H. P. at 100 Lbs. at Speed Given	Pipe Openings, Inches			Fly Wheels		Floor Space, Inches	Height Above Foundation, Inches	Weight, Pounds	Packed for Export		Code Word
					Air Inlet	Air Discharge	Water Jacket	Diam., Inches	Face, Inches				Weight, Pounds	Cubic Feet	
SINGLE CYLINDER DOUBLE ACTING COMPRESSORS															
6	6	200	38.6	7.5	2	1½	½	30	5½	27¼x60¼	25½	1187	1470	40	Aicom
8	8	170	77.8	16.8	2½	2	½	40	6½	30 x74½	33¼	1950	2450	70	Aidun
10	10	150	134.3	26.3	3½	2½	¾	50	10½	45 x92⅜	39	3590	4390	150	Aifap
10	12	140	151.0	29.0	3½	2½	¾	60	10½	48 x104	46	4370	5300	220	Aibac
12	12	140	217.0	43	4	3	¾	60	12½	52 x107	46	5110	6200	240	Aiger
12	14	125	227.0	45	4	3	¾	70	12½	52 x125	54	5260	6400	266	Aibed
DUPLEX DOUBLE ACTING COMPRESSORS															
10	12	140	302.0	56.0	5	3	1¼	60	16	108x 72	64	8925	10600	250	Aibif
12	14	125	454.0	82.0	6	4	1¼	72	20	126x 38	76	13650	15970	352	Aibog
TWO STAGE DOUBLE ACTING COMPRESSORS															
14& 9	10	180	320.0	62.0	5	3	1	50	14½	97x 75	53	8700	9600	167	Aitab
16&10	12	170	470.0	85.0	6	3	1	60	17	112x 86	64	12500	13700	298	Aibat
18&11	14	150	615.0	112.0	7	3½	1	72	21	133x100	76	17500	19000	435	Aidog

The Single Compressors have two belt fly wheels each being of proper size to drive the compressors with single belt.

The Duplex and two stage machines have one belt fly wheel of proper size to drive the Compressors, using double belt.

The right hand side of our Horizontal Belted Air Compressor is the right hand side as one stands at the crank shaft, or power end, and looks over the machine towards the air cylinder.

The horse-power column shows the power that must be supplied at the rim of the belt wheel when the compressors are being operated at sea level and compressing to 100 pounds gauge pressure.

Two Stage Duplex Compressors

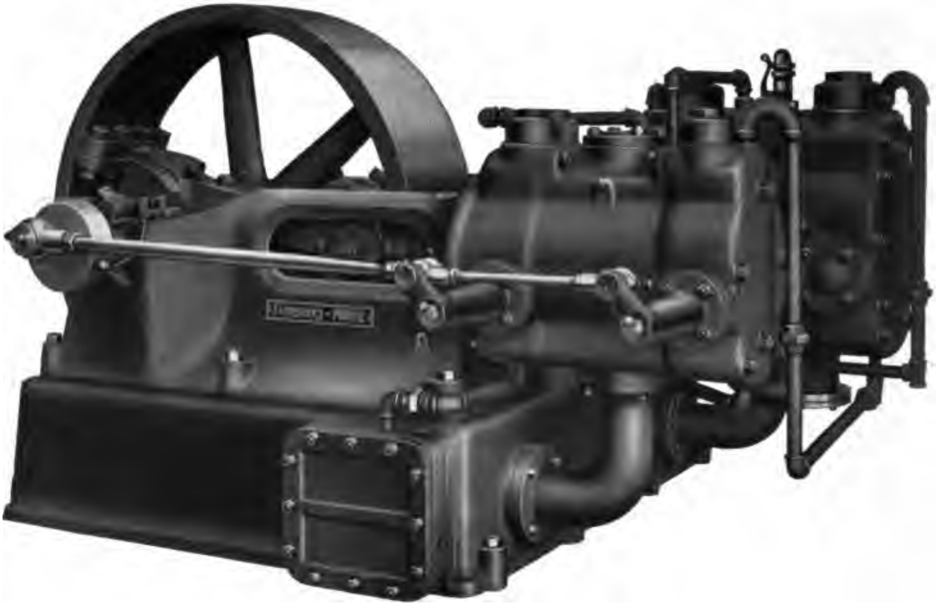


Fig. 413—Size 14x9x10—Two Stage Air Compressor.

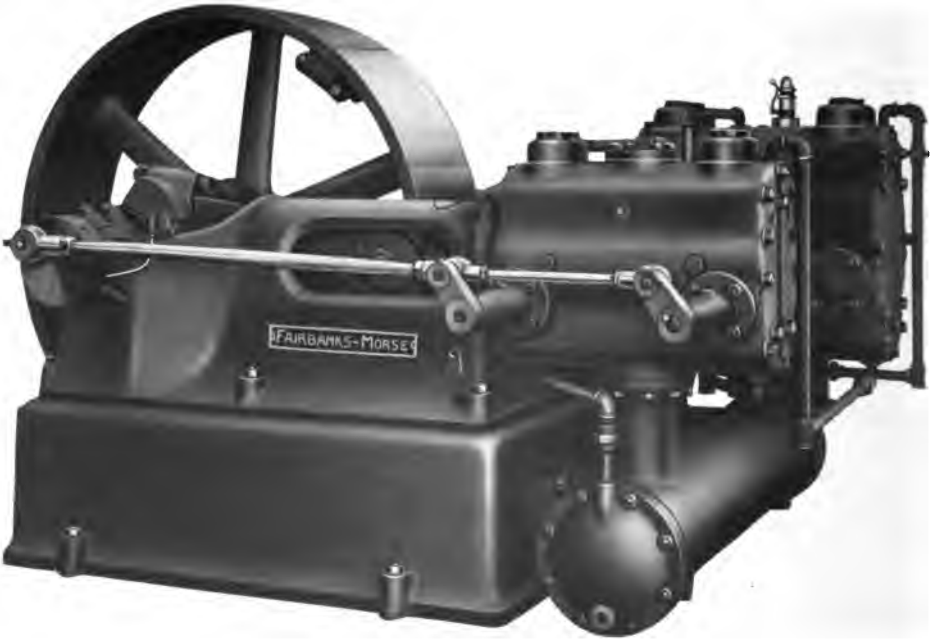


Fig. 414—Size 16x10x12—Two Stage Air Compressor.

Standard Wrought Pipe
Extra Strong Wrought Pipe
Double Extra Strong Wrought Pipe
Casing, Line Pipe
Drive Pipe, Drill Pipe
Tubing

Stove Pipe Casing
Boiler Tubes
Couplings
Nipples
Malleable Fittings

Standard Cast Iron Fittings
Extra Heavy Cast Iron Fittings
Casing Fittings
Flanged Fittings

Pages 193 to 229 Inclusive

Pipe Trade Customs

Every piece of Pipe, Tubing, Casing, Line Pipe, Drive Pipe, Boiler Tube, etc., is carefully tested, but as it is impossible to always detect imperfections, the only guarantee that is given is to replace such goods as prove defective. Under no circumstances are we responsible for any damages beyond the price of the goods. No charges for labor or expense required to repair defective goods or occasioned by them will be allowed. If the goods are defective the measure of damages is the price of the defective pieces.

Claims for shortages or deductions for erroneous charges must be promptly presented, or will not be allowed.

Special goods made to specifications, where buyer is to inspect, must be inspected and accepted before shipment is made. After shipment is made our responsibility ceases.

Requests for cancellation of orders, calling for odd sizes or cut lengths, will not be considered if the manufacture of the material has been commenced when the request reaches the mill.

Standard Wrought Pipe is sold in random lengths with threads on both ends, and with a coupling on one end of each piece.

Extra Strong, Double Extra Strong and Hydraulic Pipe is sold without threads or couplings, unless threads and couplings are specified, and then an additional charge will be made for such threads and couplings.

Random length of Extra Strong and Double Extra Strong Pipe is considered to be 12 feet to 22 feet, we to have the privilege, however, of supplying not exceeding 5 per cent of the total order in lengths from 6 feet to 12 feet.

An extra charge is always made for pipe cut to special lengths.

Pipe "cut to order" is threaded at each end, but no couplings are furnished. If couplings are desired they must be ordered, and an extra charge will be made for them.

Standard weight Casing (the lightest weight) will be furnished on orders unless a heavier weight is specified.

The outside diameter of goods heavier than "Standard" is the same as "Standard"; the extra thickness being on the inside, so that different weights of the same size use the same couplings.

Boiler Tubes are rated by their outside diameter; all other pipe by the nominal inside diameter.

Quotations are for immediate acceptance.

Prices are subject to change without notice.

All sales are subject to strikes, accidents, or causes beyond our control.

Standard Wrought Pipe

FULL STANDARD WEIGHT

FOR STEAM, GAS AND WATER

BLACK AND GALVANIZED

LIST REVISED AND ADOPTED JAN. 1, 1913

Size, Inches	Price Black or Galvanized, per Foot	Nominal Outside Diameter, Inches	Nominal Inside Diameter, Inches	Thickness, Inches	Nominal Weight Per Foot, Pounds	Number of Threads Per Inch
⅛	$0.05½	.405	.269	.068	.245	27
¼	.06	.540	.364	.088	.425	18
⅜	.06	.675	.493	.091	.568	18
½	.08½	.840	.622	.109	.852	14
¾	.11½	1.050	.824	.113	1.134	14
1	.17	1.315	1.049	.133	1.684	11½
1¼	.23	1.660	1.380	.140	2.281	11½
1½	.27½	1.900	1.610	.145	2.731	11½
2	.37	2.375	2.067	.154	3.678	11½
2½	.58½	2.875	2.469	.203	5.819	8
3	.76½	3.500	3.068	.216	7.616	8
3½	.92	4.000	3.548	.226	9.202	8
4	1.09	4.500	4.026	.237	10.889	8
4½	1.27	5.000	4.506	.247	12.642	8
5	1.48	5.563	5.047	.258	14.810	8
6	1.92	6.625	6.065	.280	19.185	8
7	2.38	7.625	7.023	.301	23.769	8
8	2.50	8.625	8.071	.277	25.000	8
8	2.88	8.625	7.981	.322	28.809	8
9	3.45	9.625	8.941	.342	34.188	8
10	3.20	10.750	10.192	.279	32.000	8
10	3.50	10.750	10.136	.307	35.000	8
10	4.12	10.750	10.020	.365	41.132	8
11	4.63	11.750	11.000	.375	46.247	8
12	4.50	12.750	12.090	.330	45.000	8
12	5.07	12.750	12.000	.375	50.706	8

The permissible variation in weight is 5 per cent. above and 5 per cent. below.

Unless otherwise ordered, black pipe with threads and couplings and in random lengths, will be shipped.

For cut lengths, an extra charge will be made above random lengths, in which case couplings are not included unless specified, and then charged extra.

For pipe smoothed on the inside, known as reamed and drifted, an extra charge will be made above standard pipe.

For galvanized, or coated pipe, an extra charge will be made above black.

Extra Strong and Double Extra Strong Wrought Pipe

FULL STANDARD WEIGHT

FOR STEAM, GAS AND WATER

BLACK AND GALVANIZED

LIST REVISED AND ADOPTED JAN. 1, 1913

EXTRA STRONG

Size, Inches	Price Black or Galvanized, Per Foot	Nominal Outside Diameter, Inches	Nominal Inside Diameter, Inches	Thickness, Inches	Nominal Weight Per Foot, Pounds
⅛	$0.12	.405	.215	.095	.314
¼	.07½	.540	.302	.119	.535
⅜	.07½	.675	.423	.126	.738
½	.11	.840	.546	.147	1.087
¾	.15	1.050	.742	.154	1.473
1	.22	1.315	.957	.179	2.171
1¼	.30	1.660	1.278	.191	2.996
1½	.36½	1.900	1.500	.200	3.631
2	.50½	2.375	1.939	.218	5.022
2½	.77	2.875	2.323	.276	7.661
3	1.03	3.500	2.900	.300	10.252
3½	1.25	4.000	3.364	.318	12.505
4	1.50	4.500	3.826	.337	14.983
4½	1.80	5.000	4.290	.355	17.611
5	2.08	5.563	4.813	.375	20.778
6	2.86	6.625	5.761	.432	28.573
7	3.81	7.625	6.625	.500	38.048
8	4.34	8.625	7.625	.500	43.388
9	4.90	9.625	8.625	.500	48.728
10	5.48	10.750	9.750	.500	54.735
11	6.10	11.750	10.750	.500	60.075
12	6.55	12.750	11.750	.500	65.415

The permissible variation in weight is 5 per cent. above and 5 per cent. below.

DOUBLE EXTRA STRONG

Size, Inches	Price Black or Galvanized, Per Foot	Nominal Outside Diameter, Inches	Nominal Inside Diameter, Inches	Thickness, Inches	Nominal Weight Per Foot, Pounds
½	$0.32	.840	.252	.294	1.714
¾	.35	1.050	.434	.308	2.440
1	.37	1.315	.599	.358	3.659
1¼	.52½	1.660	.896	.382	5.214
1½	.65	1.900	1.100	.400	6.408
2	.91	2.375	1.503	.436	9.029
2½	1.37	2.875	1.771	.552	13.695
3	1.86	3.500	2.300	.600	18.583
3½	2.30	4.000	2.728	.636	22.850
4	2.76	4.500	3.152	.674	27.541
4½	3.26	5.000	3.580	.710	32.530
5	3.86	5.563	4.063	.750	38.552
6	5.32	6.625	4.897	.864	53.160
7	6.35	7.625	5.875	.875	63.079
8	7.25	8.625	6.875	.875	72.424

The permissible variation in weight is 10 per cent. above and 10 per cent. below.

Unless otherwise ordered, black pipe with plain ends and in random lengths, will be shipped.

For pipe fitted with threads and couplings, an extra charge will be made above plain ends.

For cut lengths, an extra charge will be made above random.

For galvanized, or coated pipe, an extra charge will be made above black.

Lap Welded Casing

FOR WATER WELLS AND IRRIGATION PURPOSES

Size, Inches	Price Black or Galvanized, per Foot	Nominal Outside Diameter, Inches	Nominal Inside Diameter, Inches	Thickness, Inches	Nominal Weight Per Foot, Pounds	Number of Threads Per Inch
2	$0.33	2.250	2.050	.100	2.340	14
2¼	.33	2.500	2.284	.108	2.820	14
2½	.33	2.750	2.524	.113	3.250	14
2¾	.40	3.000	2.768	.116	3.650	14
3	.41	3.250	3.010	.120	4.100	14
3¼	.46	3.500	3.250	.125	4.600	14
3½	.51	3.750	3.492	.129	5.100	14
3¾	.56½	4.000	3.732	.134	5.650	14
4	.62	4.250	3.974	.138	6.200	14
4¼	.68½	4.500	4.216	.142	6.750	14
4½	.74	4.750	4.460	.145	7.250	14
4¾	.81	5.000	4.696	.152	8.000	14
5	.85	5.250	4.944	.153	8.500	14
5 3/16	.90	5.500	5.192	.154	9.000	14
5⅝	1.05	6.000	5.672	.164	10.500	14
6¼	1.20	6.625	6.287	.169	12.000	14
6⅝	1.35	7.000	6.652	.174	13.000	14
7¼	1.48	7.625	7.263	.181	14.750	14
7⅝	1.60	8.000	7.628	.186	16.000	11½
8¼	1.75	8.625	8.249	.188	17.500	11½
8⅝	1.90	9.000	8.608	.196	19.000	11½
9⅝	2.28	10.000	9.582	.209	22.750	11½
10⅝	2.68	11.000	10.552	.224	26.750	11½
11⅝	3.15	12.000	11.514	.243	31.500	11½
12½	3.65	13.000	12.482	.259	36.500	11½
13½	4.20	14.000	13.448	.276	42.000	11½
14½	4.75	15.000	14.418	.291	47.500	11½
15½	5.25	16.000	15.396	.302	52.500	11½

Lap Welded Casing

FOR OIL WELL PURPOSES

Size, Inches	Nominal Outside Diameter, Inches	Nominal Inside Diameter, Inches	Thickness, Inches	Nominal Weight Per Foot, Pounds	Number of Threads Per Inch
4¼	4.500	4.216	.142	6.750	14
4¼	4.500	4.090	.205	9.500	14
4½	4.750	4.460	.145	7.250	14
4½	4.750	4.364	.193	9.500	14
4¾	5.000	4.696	.152	8.000	14
5	5.250	4.944	.153	8.500	14
5 3/16	5.500	5.192	.154	9.000	14
5⅝	6.000	5.672	.164	10.500	14
5⅝	6.000	5.620	.190	12.000	11½
5⅝	6.000	5.552	.224	14.000	11½
5⅝	6.000	5.450	.275	17.000	11½
6¼	6.625	6.287	.169	12.000	14
6¼	6.625	6.257	.184	13.000	11½
6¼	6.625	6.135	.245	17.000	11½
6⅝	7.000	6.652	.174	13.000	14
6⅝	7.000	6.538	.231	17.000	11½
6⅝	7.000	6.538	.231	17.000	10
6⅝	7.000	6.450	.275	20.000	10
7¼	7.625	7.263	.181	14.750	14
7⅝	8.000	7.628	.186	16.000	11½
7⅝	8.000	7.528	.236	20.000	11½
8¼	8.625	8.249	.188	17.500	11½
8¼	8.625	8.191	.217	20.000	11½
8¼	8.625	8.097	.264	24.000	11½
8¼	8.625	8.097	.264	24.000	8
8⅝	9.000	8.608	.196	19.000	11½
9⅝	10.000	9.582	.209	22.750	11½
9⅝	10.000	9.434	.283	30.250	11½
10	10.750	10.192	.279	32.515	8
10	10.750	10.146	.302	35.000	8
10⅝	11.000	10.552	.224	26.750	11½
11⅝	12.000	11.514	.243	31.500	11½
12½	13.000	12.482	.259	36.500	11½
12½	13.000	12.278	.361	50.000	8
13½	14.000	13.448	.276	42.000	11½
14½	15.000	14.418	.291	47.500	11½
15½	16.000	15.396	.302	52.500	11½

The permissible variation in weight is 5 per cent. above and 5 per cent. below.

Unless otherwise ordered, black casing with threads and couplings and in random lengths, will be shipped.

For cut lengths, an extra charge will be made above random.

For galvanized, or coated casing, an extra charge will be made above black.

Lap Welded Casing

"COALINGA SPECIAL"

Size, Inches	Nominal Outside Diameter, Inches	Nominal Inside Diameter, Inches	Thickness, Inches	Nominal Weight Per Foot, Pounds	Number of Threads Per Inch
4½	4.750	4.082	.334	16.000	10
4¾	5.000	4.506	.247	12.850	10
4¾	5.000	4.424	.288	15.000	10
5⅝	6.000	5.352	.324	20.000	10
6¼	6.625	6.049	.288	20.000	10
6¼	6.625	5.921	.352	24.000	10
6¼	6.625	5.855	.385	26.000	10
6¼	6.625	5.791	.417	28.000	10
6⅝	7.000	6.456	.272	20.000	10
6⅝	7.000	6.276	.362	26.000	10
6⅝	7.000	6.214	.393	28.000	10
6⅝	7.000	6.154	.423	30.000	10
7⅝	8.000	7.386	.307	26.000	10
8¼	8.625	8.017	.304	28.000	10
8¼	8.625	7.921	.352	32.000	10
8¼	8.625	7.825	.400	36.000	10
8¼	8.625	7.775	.425	38.000	10
8¼	8.625	7.651	.487	43.000	10
9⅝	10.000	9.384	.308	33.000	10
10	10.750	10.054	.348	40.000	10
10	10.750	9.960	.395	45.000	10
10	10.750	9.902	.424	48.000	10
10	10.750	9.784	.483	54.000	10
11⅝	12.000	11.884	.308	40.000	10
12½	13.000	12.438	.281	40.000	10
12½	13.000	12.360	.320	45.000	10
12½	13.000	12.282	.359	50.000	10
12½	13.000	12.220	.390	54.000	10
13½	14.000	13.344	.328	50.000	10
15½	16.000	15.198	.401	70.000	10

The permissible variation in weight is 5 per cent. above and 5 per cent. below.

Unless otherwise ordered, black casing with threads and couplings and in random lengths, will be shipped.

For cut lengths, an extra charge will be made above random.

For galvanized, or coated casing, an extra charge will be made above black.

Line Pipe

FULL STANDARD WEIGHT

Size, Inches	Price, Per Foot	Nominal Outside Diameter, Inches	Nominal Inside Diameter, Inches	Thickness, Inches	Nominal Weight Per Foot, Pounds	Number of Threads Per Inch
* 2	$0.87½	2.375	2.067	.154	3.716	11½
2½	.59	2.875	2.469	.203	5.881	8
3	.77	3.500	3.068	.216	7.675	8
3½	.93	4.000	3.548	.226	9.261	8
4	1.10	4.500	4.026	.237	10.980	8
4½	1.28	5.000	4.506	.247	12.742	8
5	1.50	5.563	5.047	.258	14.966	8
6	1.94	6.625	6.065	.280	19.367	8
7	2.40	7.625	7.023	.301	23.975	8
8	2.54	8.625	8.071	.277	25.414	8
8	2.92	8.625	7.981	.322	29.213	8
9	3.47	9.625	8.941	.342	34.612	8
10	3.25	10.750	10.192	.279	32.515	8
10	3.55	10.750	10.136	.307	35.504	8
10	4.17	10.750	10.020	.365	41.644	8
11	4.68	11.750	11.000	.375	46.805	8
12	4.55	12.750	12.090	.330	45.217	8
12	5.12	12.750	12.000	.375	50.916	8
13	5.68	14.000	13.250	.375	56.649	8
14	6.18	15.000	14.250	.375	60.802	8
15	6.60	16.000	15.250	.375	64.955	8

*2-inch gas line pipe 1200 pounds test. 2-inch oil line pipe 1800 pounds test.

*2-inch selected oil line pipe 1800 pounds test. Uniform lengths and reamed.

The permissible variation in weight is 5 per cent. above and 5 per cent. below.

Unless otherwise ordered, black line pipe with threads and couplings and in random lengths, will be shipped.

For cut lengths, an extra charge will be made above random.

For galvanized, or coated line pipe, an extra charge will be made above black.

Lap Welded Drive Pipe

Size, Inches	Nominal Outside Diameter, Inches	Nominal Inside Diameter, Inches	Thickness, Inches	Nominal Weight Per Foot, Pounds	Number of Threads Per Inch	Couplings	
						Outside Diameter, Inches	Length, Inches
4½	5.000	4.506	.247	12.758	8	5 23/32	4 3/16
5	5.563	5.047	.258	14.989	8	...	...
6	6.625	6.065	.280	19.408	8	7 9/16	5¼
7	7.625	7.023	.301	24.021	8	8⅝	6 5/16
8	8.625	8.071	.277	25.495	8	9 13/32	6⅜
8	8.625	7.981	.322	29.303	8	9 13/32	6⅜
8	8.625	7.917	.354	32.334	8	9 11/16	6⅜
10	10.750	10.192	.279	32.631	8	12 1/16	6⅜
10	10.750	10.136	.307	35.628	8	12 1/16	6⅜
10	10.750	10.020	.365	41.785	8	12 1/16	6⅜
12	12.750	12.090	.330	45.358	8	13 15/16	6½
12	12.750	12.000	.375	51.067	8	13 15/16	6½

The permissible variation in weight is 5 per cent. above and 5 per cent. below.

Unless otherwise ordered, black drive pipe with threads and couplings and in random lengths, will be shipped.

For cut lengths, an extra charge will be made above random.

For galvanized, or coated drive pipe, an extra charge will be made above black.

Drive pipe is fitted with recessed couplings, and is so threaded that the ends of the pipe will butt together in the center of the coupling when fully screwed up.

Drill Pipe

Size, Inches	Nominal Outside Diameter, Inches	Nominal Inside Diameter, Inches	Thickness, Inches	Nominal Weight Per Foot, Pounds	Number of Threads Per Inch	Length of Thread, Inches	Couplings	
							Outside Diameter, Inches	Length, Inches
2½	2.875	2.323	.276	7.830	8	2½	3 11/16	5⅜
2½	2.875	2.143	.366	10.000	8	2½	3 11/16	5⅜
4	4.500	4.026	.237	11.055	8	2⅝	5 9/16	6⅝
4	4.500	3.990	.255	11.815	8	2⅝	5 9/16	6⅝
4	4.500	3.958	.271	12.500	8	2⅝	5 9/16	6⅝
4	4.500	3.826	.337	15.000	8	2⅝	5 9/16	6⅝
4½	5.000	4.506	.247	12.744	8	3	5 15/16	7⅛
4½	5.000	4.388	.306	15.500	8	3	5 15/16	7⅛
5	5.563	4.813	.375	21.000	8	3	6 7/16	7¼
6	6.625	6.065	.280	19.463	8	3	7 17/32	7¼
6	6.625	5.937	.344	23.500	8	3	7 17/32	7¼
6	6.625	5.761	.432	29.000	8	3	7 17/32	7¼

The permissible variation in weight is 5 per cent. above and 5 per cent. below.

Unless otherwise ordered, black drill pipe with threads and couplings and in random lengths, will be shipped.

Tubing

Size, Inches	Nominal Outside Diameter, Inches	Nominal Inside Diameter, Inches	Thickness, Inches	Nominal Weight Per Foot, Pounds	Number of Threads Per Inch	Couplings	
						Outside Diameter, Inches	Length, Inches
2	2.375	2.067	.154	3.716	11½	2 29/32	3 11/16
2	2.375	2.041	.167	4.000	11½	2 29/32	3 11/16
2	2.375	1.995	.190	4.500	11½	2 29/32	3 11/16
2½	2.875	2.469	.203	5.897	11½	3 9/16	4 3/16
2½	2.875	2.441	.217	6.250	11½	3 9/16	4 3/16
3	3.500	3.068	.216	7.694	11½	4 5/32	4 3/16
3	3.500	3.018	.241	8.500	11½	4 5/32	4 3/16
3	3.500	2.922	.289	10.000	11½	4 5/32	4 3/16
3½	4.000	3.548	.226	9.261	8	4 25/32	4 3/16
4	4.500	4.026	.237	10.980	11½	5 7/32	4¼
4	4.500	4.026	.237	10.980	8	5 7/32	4¼
4	4.500	3.990	.255	11.750	8	5 7/32	4¼

The permissible variation in weight is 5 per cent. above and 5 per cent. below.

Unless otherwise ordered, black tubing with threads and couplings and in random lengths, will be shipped.

For cut lengths, an extra charge will be made above random.

For galvanized, or coated tubing, an extra charge will be made above black.

Stove Pipe Casing

FOR OIL WELL PURPOSES

Fig. 415

IN SECTIONS 4 FEET TO 20 FEET LONG

Diameter, Inches	Gauge Number	Weight Per Foot, Pounds	Price, Per Foot	Diameter, Inches	Gauge Number	Weight Per Foot, Pounds	Price, Per Foot
12	10	39.185	$1.96	14	8	55.9	$2.58
13	10	42.316	2.03½	15	8	59.5	2.74½
14	10	45.416	2.18	16	8	63.2	2.91
15	10	48.516	2.25½	17	8	67.1	3.10½
16	10	51.655	2.41	18	8	71.0	3.28
17	10	54.855	2.54½	20	8	79.4	3.58
18	10	58.055	2.67				
20	10	64.780	2.94				

Double Well Casing

LOOSE JOINTS—PRICES AND WEIGHTS PER FOOT OR JOINT

Diameter, Inches	GAUGE NUMBER									
	16		14		12		10		8	
	Wt., Pounds	Price, Per Foot	Wt., Pounds	Price, Per Foot	Wt., Pounds	Price, Per Foot	Wt., Pounds	Price, Per Foot	Wt., Pounds	Price, Per Foot
4	6.2	$0.38	7.8	$0.46	......	......	......	......	......	......
5	7.5	.44	9.5	.53	13.4	$0.67	......	......	......	......
6	8.9	.52	11.2	.61	15.8	.82	20.3	$0.94	......	......
7	10.3	.59	12.9	.68	17.9	.87	23.1	1.10	......	......
8	11.7	.69	14.6	.80	20.5	.96	26.4	1.21	......	......
8½	12.0	.69	15.0	.84	21.1	.99	27.5	1.26	......	......
9	13.1	.74	16.4	.89	23.0	1.09	29.6	1.40	......	......
9½	13.8	.81	17.3	.95	24.2	1.15	31.1	1.47	......	......
10	14.5	.83	18.1	.99	25.4	1.20	32.7	1.54	......	......
11	16.0	.85	19.9	1.04	27.9	1.29	35.8	1.58	......	......
12	17.3	.90	21.5	1.06	30.3	1.37	38.9	1.78	......	......
13	18.6	.98	23.3	1.09	32.7	1.47	42.0	1.84	......	......
14	20.1	1.08	25.0	1.20	35.2	1.62	45.1	1.97	55.4	$2.37
15	21.3	1.15	26.7	1.29	37.6	1.77	48.2	2.03	59.0	2.52
16	22.9	1.21	28.5	1.33	39.8	1.94	51.3	2.17	62.7	2.67
17	24.1	1.28	30.3	1.41	42.3	2.01	54.5	2.29	66.6	2.85
18	25.5	1.33	32.0	1.47	44.8	2.07	57.7	2.40	70.5	3.01
20	28.4	1.43	35.5	1.57	49.9	2.23	64.4	2.64	78.9	3.28
22	31.2	1.55	39.0	1.82	54.9	2.46	70.8	2.96	86.4	3.58
24	33.9	1.64	42.5	2.05	59.8	2.69	76.9	3.20	93.8	3.88

Double Well Casing is furnished in 24-inch joints, and, unless otherwise specified, an equal number of inside and outside joints will be furnished.

EXTRAS

Charge for riveting casing in sections, 4 to 20 feet long, as follows:

No. 16, 14 and 12 Gauges—All sizes—1 c. per foot for each inch diameter.
No.. 10 Gauges—All sizes—1½c. per foot for each inch diameter.
No. 8 Gauges—All sizes—2 c. per foot for each inch diameter.

Galvanized Casing.—All sizes and all gauges—20 per cent advance over prices listed.

Casing lighter than No. 16 Gauge price is same as for No. 16.

Double Riveted Well Casing.—Our double casing has single riveted joints. Double riveting takes an advance of 20 per cent over prices for standard.

Cut, Punched, Rolled and Nested Casing:

A discount of 5 per cent will be allowed for casing cut, punched and rolled but not riveted. Casing furnished in this way is securely nested for shipment.

Re-riveting Double Casing:

No. 16 and No. 14 Gauges—All sizes................per 24-inch joint—15c.
No. 12 Gauges—All sizes................per 24-inch joint—20c.
No. 10 Gauges—All sizes................per 24-inch joint—25c.

Starters

FOR DOUBLE WELL CASING
PRICES AND WEIGHTS PER FOOT

NUMBER 16 GAUGE

Diameter, Inches	NUMBER OF PLIES THICK					
	2		3		4	
	Wt., Lbs.	Price, Per Foot	Wt., Lbs.	Price, Per Foot	Wt., Lbs.	Price, Per Foot
4	6.2	$0.57	9.4	$0.94	12.8	$1.31
5	7.5	.62	11.4	.97	15.4	1.35
6	8.9	.70	13.5	1.15	18.2	1.58
7	10.3	.77	15.6	1.26	21.0	1.73
8	11.7	.87	17.7	1.41	23.8	1.94
8¼	12.0	.87	18.1	1.41	24.4	1.94
9	13.1	.94	19.8	1.49	26.6	2.05
9½	13.8	.98	20.8	1.57	28.0	2.18
10	14.5	1.00	21.9	1.60	29.4	2.20
11	16.0	1.04	24.1	1.64	32.4	2.25
12	17.3	1.09	26.1	1.74	35.0	2.38
13	18.6	1.17	28.2	1.85	37.6	2.53
14	20.0	1.26	30.2	1.98	40.4	2.70
15	21.3	1.33	32.2	2.09	43.0	2.85
16	22.9	1.41	34.5	2.20	46.2	3.00
17	24.1	1.46	36.3	2.29	48.6	3.11
18	25.5	1.51	38.4	2.38	51.4	3.21
20	28.4	1.65	42.7	2.55	57.2	3.40
22	31.2	1.80	46.9	2.75	62.8	3.65
24	33.9	1.95	51.0	2.95	68.2	3.90

NUMBER 14 GAUGE

Diameter, Inches	NUMBER OF PLIES THICK					
	2		3		4	
	Wt., Lbs.	Price, Per Foot	Wt., Lbs.	Price, Per Foot	Wt., Lbs.	Price, Per Foot
4	7.8	$0.66	11.9	$1.08	16.1	$1.48
5	9.5	.71	14.5	1.16	19.5	1.60
6	11.2	.81	17.0	1.30	22.9	1.78
7	12.9	.86	19.5	1.38	26.3	1.91
8	14.6	.98	22.1	1.56	29.7	2.12
8¼	15.0	1.03	22.7	1.62	30.5	2.23
9	16.3	1.08	24.8	1.71	33.3	2.32
9½	17.3	1.13	26.1	1.80	35.1	2.45
10	18.1	1.18	27.4	1.86	36.7	2.56
11	19.9	1.23	30.1	1.94	40.3	2.62
12	21.5	1.25	32.5	1.97	43.5	2.68
13	23.3	1.28	35.2	2.00	47.1	2.72
14	25.0	1.38	37.7	2.19	50.5	2.97
15	26.7	1.47	40.2	2.30	53.9	3.12
16	28.5	1.53	43.0	2.38	57.5	3.21
17	30.3	1.59	45.7	2.48	61.1	3.35
18	32.0	1.64	48.2	2.58	64.5	3.48
20	35.5	1.77	53.5	2.75	71.5	3.70
22	39.0	2.02	58.7	3.05	78.5	4.08
24	42.5	2.27	64.0	3.35	85.5	4.43

NUMBER 12 GAUGE

Diameter, Inches	NUMBER OF PLIES THICK					
	2		3		4	
	Wt., Lbs.	Price, Per Foot	Wt., Lbs.	Price, Per Foot	Wt., Lbs.	Price, Per Foot
5	13.4	$0.91	20.5	$1.49	27.8	$2.06
6	15.8	1.06	24.1	1.72	32.6	2.37
7	17.9	1.12	27.2	1.78	36.8	2.48
8	20.5	1.21	31.1	1.95	42.0	2.67
8¼	21.1	1.25	32.0	1.99	43.2	2.73
9	23.0	1.33	34.9	2.12	47.0	2.91
9½	24.2	1.40	36.7	2.21	49.4	3.03
10	25.4	1.46	38.5	2.31	51.8	3.18
11	27.9	1.54	42.2	2.43	56.8	3.31
12	30.3	1.61	45.8	2.55	61.6	3.47
13	32.7	1.72	49.4	2.70	66.4	3.67
14	35.2	1.88	53.2	2.94	71.4	4.01
15	37.6	2.02	56.8	3.15	76.2	4.27
16	39.8	2.18	60.1	3.40	80.6	4.59
17	42.3	2.26	63.8	3.50	85.6	4.73
18	44.8	2.33	67.6	3.61	90.6	4.90
20	49.9	2.66	75.2	3.98	100.8	5.31
22	54.9	2.89	82.7	4.25	110.8	5.71
24	59.8	3.19	90.1	4.81	120.6	6.43

NUMBER 10 GAUGE

Diameter, Inches	NUMBER OF PLIES THICK					
	2		3		4	
	Wt., Lbs.	Price, Per Foot	Wt., Lbs.	Price, Per Foot	Wt., Lbs.	Price, Per Foot
...	.....	.....	.....	.....	.....	.....
6	20.3	$1.25	31.1	$1.97	42.3	$2.68
7	23.1	1.47	35.3	2.20	47.9	3.00
8	26.4	1.54	40.2	2.40	54.5	3.24
8¼	27.5	1.57	41.9	2.45	56.7	3.32
9	29.6	1.71	45.0	2.66	60.9	3.59
9½	31.1	1.78	47.3	2.76	64.0	3.74
10	32.7	1.84	49.7	2.84	67.1	3.86
11	35.8	1.89	54.3	2.93	73.3	3.96
12	38.9	2.09	59.0	3.23	79.5	4.35
13	42.0	2.21	63.6	3.38	85.7	4.55
14	45.1	2.33	68.3	3.57	91.9	4.79
15	48.2	2.41	72.9	3.67	98.1	4.92
16	51.3	2.54	77.6	3.86	104.3	5.19
17	54.5	2.66	82.4	4.03	110.7	5.42
18	57.7	2.76	87.2	4.20	117.1	5.64
20	64.4	3.07	97.2	4.61	130.5	6.13
22	70.8	3.49	106.8	5.03	143.3	6.63
24	76.9	3.72	116.0	5.46	155.5	7.44

NUMBER 8 GAUGE

Diameter, Inches	NUMBER OF PLIES THICK						Diameter, Inches	NUMBER OF PLIES THICK					
	2		3		4			2		3		4	
	Wt., Lbs.	Price, Per Foot	Wt., Lbs.	Price, Per Foot	Wt., Lbs.	Price, Per Foot		Wt., Lbs.	Price, Per Foot	Wt., Lbs.	Price, Per Foot	Wt., Lbs.	Price, Per Foot
16	62.7	$2.99	95.0	$4.35	127.9	$5.90	20	78.9	$3.71	119.3	$5.25	160.3	$6.90
17	66.6	3.19	100.8	4.60	135.7	6.15	22	86.4	4.01	130.5	5.65	175.3	7.75
18	70.5	3.37	106.7	4.85	143.5	6.35	24	93.8	4.37	141.6	6.05	190.1	8.65

Well Rings or Shoes for Starters

FOR DOUBLE WELL CASING

Diameter, Inches	Length, Inches	Thickness, Inches	Price, Each	Diameter, Inches	Length, Inches	Thickness, Inches	Price, Each	Diameter, Inches	Length, Inches	Thickness, Inches	Price, Each	Diameter, Inches	Length, Inches	Thickness, Inches	Price, Each
4	2½	¼	$3.25	10	4	½	$7.80	14	4	⅝	$15.00	17	8	⅞	$37.50
4	3	¼	3.55	10	4	⅝	8.80	14	4	¾	16.00	17	8	1	40.00
4	3	⅜	3.75	10	4	¾	11.00	14	5	⅝	19.00	17	10	¾	40.00
4	4	⅜	5.00	10	4	1	13.00	14	5	¾	20.00	17	10	⅞	41.00
5	2½	¼	3.50	10	5	½	12.00	14	6	⅝	21.00	17	10	1	42.50
5	3	⅜	4.00	10	5	⅝	13.00	14	6	¾	23.00	17	10	1⅛	49.00
5	4	⅜	5.00	10	5	¾	13.85	14	6	1	27.00	17	10	1¼	55.00
5	4	½	5.50	10	6	½	13.00	14	8	¾	27.00	17	12	¾	37.30
5	6	⅜	8.50	10	6	⅝	14.00	14	8	⅞	30.00	17	12	1	45.00
6	2½	¼	3.75	10	6	¾	15.00	14	8	1	32.00	17	12	1⅛	52.00
6	3	⅜	4.25	10	6	⅞	16.00	14	10	¾	32.00	17	12	1¼	59.00
6	4	⅜	5.00	10	6	1	18.00	14	10	⅞	32.50	17	18	1	90.00
6	4	½	5.60	10	8	⅝	18.00	14	10	1	34.00	18	5	⅝	27.00
6	4	⅝	6.60	10	8	¾	19.00	14	12	¾	36.00	18	6	¾	32.00
6	4	¾	7.60	10	8	⅞	23.00	14	12	1	38.00	18	6	⅞	35.00
6	5	⅝	8.50	10	8	1	25.00	14	12	1¼	45.00	18	6	1	38.00
6	6	¾	11.50	10	10	½	20.00	15	4	½	15.75	18	8	¾	38.00
6½	2½	¼	4.00	10	10	⅝	23.00	15	5	⅝	20.00	18	8	⅞	41.00
6½	3	⅜	5.00	10	10	¾	25.00	15	6	⅝	22.00	18	8	1	44.00
7	2½	¼	4.00	10	10	⅞	27.00	15	6	¾	24.00	18	10	¾	44.00
7	3	⅜	4.50	10	10	1	29.00	15	6	1	31.00	18	10	⅞	45.00
7	3	½	5.50	11	4	½	9.00	15	8	¾	31.00	18	10	1	46.50
7	4	⅜	5.50	11	4	⅝	10.00	15	8	⅞	33.00	18	10	1⅛	52.00
7	4	½	6.00	11	4	¾	13.00	15	8	1	35.00	18	10	1¼	59.00
7	4	⅝	7.00	11	5	⅝	14.00	15	10	⅝	32.00	18	12	¾	41.00
7	4	¾	8.00	11	5	¾	15.00	15	10	¾	35.00	18	12	1	49.00
7	5	½	10.00	11	6	¾	17.00	15	10	⅞	36.00	18	12	1⅛	55.00
7	5	⅝	10.75	11	6	1	24.00	15	10	1	37.00	18	12	1¼	62.50
7	5	¾	11.50	11	8	¾	21.50	15	12	¾	38.00	18	16	1	75.00
7	6	½	11.50	11	8	⅞	25.00	15	12	⅞	40.00	18	18	⅞	90.00
7	6	⅝	12.00	11	8	1	28.00	15	12	1	42.65	18½	8	¾	38.00
7	6	¾	12.50	12	3	⅝	10.00	15	12	1¼	47.50	18½	12	¾	48.00
8	3	⅜	5.40	12	4	½	10.50	15	15	¾	51.00	18½	14	⅞	56.00
8	4	⅜	6.00	12	4	⅝	11.50	16	6	½	26.00	18½	16	¾	75.00
8	4	½	6.50	12	4	¾	13.00	16	6	⅝	28.00	19	8	¾	46.50
8	4	⅝	7.50	12	5	½	15.00	16	6	¾	28.00	19	12	¾	55.00
8	4	¾	8.50	12	5	⅝	15.50	16	6	⅞	29.00	19	12	1	62.50
8	5	½	9.50	12	5	¾	16.00	16	6	1	32.00	19	12	1¼	75.00
8	5	⅝	10.50	12	6	½	18.00	16	8	⅝	28.00	19	16	1	90.00
8	5	¾	11.50	12	6	⅝	19.00	16	8	¾	33.00	20	6	¾	31.50
8	6	½	11.50	12	6	¾	20.00	16	8	⅞	35.00	20	8	¾	44.00
8	6	¾	13.00	12	6	1	23.00	16	8	1	37.00	20	8	1	59.00
8	8	⅝	16.50	12	7	⅞	24.00	16	10	¾	37.00	20	10	⅞	65.00
8	8	¾	17.50	12	7¾	½	23.00	16	10	⅞	38.00	20	10	1	67.00
8¼	3	⅜	5.40	12	8	⅝	23.00	16	10	1	39.00	20	12	1	70.00
8¼	4	⅜	7.00	12	8	¾	25.00	16	12	¾	40.00	22	6	¾	35.00
8¼	4	½	8.00	12	8	⅞	27.50	16	12	1	45.00	22	8	¾	52.00
8¼	4	⅝	9.00	12	8	1	30.00	16	16	¾	55.00	22	8	1	65.00
8¼	5	⅝	12.00	12	10	¾	30.00	16	16	⅞	63.00	22	10	1	75.00
8½	4	½	9.00	12	10	⅞	31.00	16	16	1	70.00	22	12	1¼	110.00
9½	3	⅜	7.00	12	10	1	32.00	16	16	1¼	75.00	24	5	⅝	35.00
9½	4	½	7.80	12	10	1⅛	40.00	16	18	¾	75.00	24	6	¾	40.00
9½	4	⅝	8.80	12	12	1	36.00	16	18	1	88.00	24	8	¾	50.00
9½	4	¾	11.00	13	8	⅝	24.00	17	6	¾	29.00	24	12	1	70.00
9½	5	⅝	12.50	13	8	¾	26.00	17	6	⅞	32.00	24	12	1¼	83.00
9½	5	¾	14.00	13	8	1	31.00	17	6	1	35.00	24	14	1½	98.00
9½	6	¾	15.00	13	10	1	33.00	17	8	⅝	32.50				
10	3	⅜	7.50	14	4	½	14.00	17	8	¾	35.00				

Standard Steel Boiler Tubes

LAP WELDED

Outside Diameter, Inches	Standard Thickness		Price—Per Foot				
	Birmingham Wire Gauge	Inches	Standard Thickness	One Extra Wire Gauge	Two Extra Wire Gauges	Three Extra Wire Gauges	Four Extra Wire Gauges
* 1	13	.095	$0.30	$0.35	$0.38	$0.42	$0.45
* 1¼	13	.095	.28	.33	.36	.39	.43
* 1½	13	.095	.27	.32	.34	.38	.42
1¾	13	.095	.22	.26	.28	.31	.34
2	13	.095	.20	.22	.24	.27	.29
2¼	13	.095	.22	.25	.28	.30	.33
2½	12	.109	.28	.31	.34	.37	.41
2¾	12	.109	.31	.34	.38	.42	.46
3	12	.109	.34	.37	.41	.45	.50
3¼	11	.120	.40	.45	.50	.55	.59
3½	11	.120	.43	.49	.53	.59	.64
3¾	11	.120	.47	.52	.57	.63	.69
4	10	.134	.55	.61	.68	.74	.83
4½	10	.134	.62	.69	.77	.83	.93
5	9	.148	.76	.86	.93	1.04	1.13
6	8	.165	1.02	1.12	1.26	1.36	1.47
7	8	.165	1.20	1.32	1.48	1.60	1.72
8	8	.165	1.38	1.50	1.69	1.83	1.97
9	7	.180	1.70	1.91	2.07	2.23	2.42
10	6	.203	2.12	2.30	2.49	2.70	2.95
11	5	.220	2.53	2.74	2.98	3.26	3.43
12	....	.229	2.88	3.12	3.40	3.65	4.00
13	4	.238	3.24	3.53	3.86	4.07	4.60

* Seamless

NOMINAL WEIGHT PER FOOT—POUNDS

* 1	13	.095	.917	1.036	1.127	1.238	1.345
* 1¼	13	.095	1.171	1.327	1.447	1.595	1.740
* 1½	13	.095	1.424	1.617	1.767	1.953	2.134
1¾	13	.095	1.679	1.910	2.089	2.312	2.532
2	13	.095	1.932	2.201	2.409	2.670	2.927
2¼	13	.095	2.186	2.492	2.729	3.028	3.322
2½	12	.109	2.783	3.050	3.386	3.717	4.114
2¾	12	.109	3.074	3.370	3.743	4.112	4.555
3	12	.109	3.365	3.691	4.101	4.508	4.995
3¼	11	.120	4.011	4.459	4.903	5.436	5.901
3½	11	.120	4.331	4.817	5.298	5.877	6.382
3¾	11	.120	4.652	5.175	5.693	6.317	6.863
4	10	.134	5.532	6.088	6.758	7.343	8.232
4½	10	.134	6.248	6.879	7.639	8.304	9.316
5	9	.148	7.669	8.520	9.266	10.400	11.231
6	8	.165	10.282	11.188	12.568	13.580	14.646
7	8	.165	12.044	13.110	14.736	15.930	17.188
8	8	.165	13.807	15.033	16.904	18.280	19.730
9	7	.180	16.955	19.072	20.629	22.271	24.179
10	6	.203	21.240	22.979	24.813	26.945	29.470
11	5	.220	25.329	27.355	29.711	32.503	34.283
12	....	.229	28.788	31.188	34.008	36.512	39.918
13	4	.238	32.439	35.243	38.569	40.691	45.971

Boiler tubes more than four gauges heavier than standard will be charged per pound.

Pipe Cutting and Threading

TO ORDER

We are prepared to cut and thread pipe from ⅛ to 12-inch inclusive, and we can execute diagram work accurately and promptly.

Our machine shop is in charge of a competent mechanic whose long experience along this line fits him for the position he holds.

All work, before leaving the shop, is personally inspected by him, great care being taken to see that the work is in accordance with specifications and finished in the most workmanlike manner known to the trade, and all engineers and steam fitters should avail themselves of our splendid facilities.

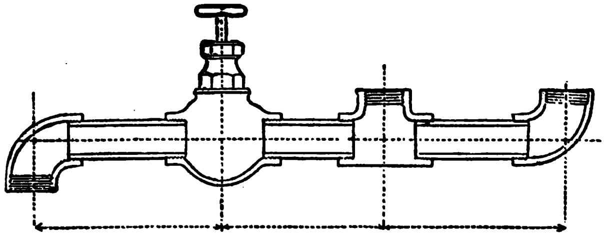


Fig. 416
Diagram Showing Screwed Valve and Fittings

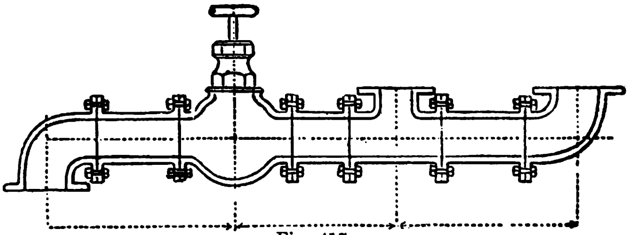


Fig. 417
Diagram Showing Flanged Valve and Fittings

In outlining work of this kind great care should be taken in making diagrams. Show whether screwed or flanged valves and fittings are wanted.

All measurements should be given center to center, if possible, as shown in above diagrams.

It is also necessary to know for what purpose the pipe is intended and the pressure it is required to stand.

STANDARD THREADS FOR WROUGHT PIPE

Size ....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Price ....each Length of thread...inches	$0.10 3/8	$0.10 9/16	$0.10 9/16	$0.10 3/4	$0.12 3/4	$0.12 15/16	$0.15 1	$0.20 1	$0.25 1 1/16	$0.35 1 1/2	$0.45 1 9/16
Size ....inches	3 1/2	4	4 1/2	5	6	7	8	9	10	12	
Price ....each Length of thread...inches	$0.55 1 5/8	$0.65 1 11/16	$0.75 1 3/4	$0.80 1 3/4	$1.00 1 7/8	$1.25 2	$1.60 2 1/16	$1.80 2 3/16	$2.30 2 5/16	$3.25 2 1/2	

Above prices include one cut for each two threads.
Additional cuts, one-half the price of threads.

SIZE OF DRILLS FOR STANDARD PIPE THREADS

The sizes of twist drills to be used in boring holes, to be reamed with pipe reamers, and threaded with pipe taps, are as follows:

Pipe Size, Inches	Number of Threads	Drill, Inches	Pipe Size, Inches	Number of Threads	Drill, Inches	Pipe Size, Inches	Number of Threads	Drill, Inches
1/8	27	21/64	1 1/2	11 1/2	1 23/32	5	8	5 1/4
1/4	18	27/64	2	11 1/2	2 3/16	6	8	6 5/16
3/8	18	9/16	2 1/2	8	2 9/16	7	8	7 5/16
1/2	14	11/16	3	8	3 3/16	8	8	8 5/16
3/4	14	29/32	3 1/2	8	3 11/16	9	8	9 5/16
1	11 1/2	1 1/8	4	8	4 3/16	10	8	10 5/16
1 1/4	11 1/2	1 15/32	4 1/2	8	4 11/16	12	8	12 21/32

Wrought Fittings

STANDARD WROUGHT COUPLINGS

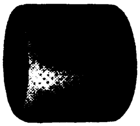


Fig. 418

FOR STEAM, GAS AND WATER PIPE

Size ....inches	1/8	1/4	3/8	1/2	3/4	1	1¼	1½	2	2½	3
Black ....each	$0.05	.05	.06	.07	.10	.13	.17	.21	.28	.40	.60
Galvanized .... "	.06	.06	.08	.10	.13	.18	.25	.32	.40	.55	.80
Right and left, black.... "	.07	.07	.08	.11	.15	.20	.25	.30	.50	.85	1.20
Size ....inches	**3½**	**4**	**4½**	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**....**
Black ....each	$0.80	1.00	1.50	1.65	2.40	3.25	4.25	5.50	7.50	10.00	....
Galvanized .... "	1.05	1.40	2.00	2.25	3.25	4.20	5.50	7.00	9.75	13.65	....
Right and left, black.... "	1.60	2.00	8.20	9.00	12.50	13.00	17.00	17.50	23.00	28.00	....

EXTRA HEAVY OR HYDRAULIC

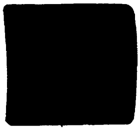


Fig. 419

Fig. 420

Size ....inches	1/2	3/4	1	1¼	1½	2	2½	3
Black ....each	$0.14	$0.20	$0.26	$0.34	$0.42	$0.56	$0.80	$1.20
Galvanized .... "	.20	.26	.36	.50	.64	.80	1.10	1.60
Right and left, black.... "	.18	.25	.33	.42	.51	.78	1.25	1.80

PATENT SLEEVE TUBING AND LINE PIPE COUPLINGS

Fig. 421

Size ....inches	1/4	3/8	1/2	3/4	1	1¼	1½	2	2½
Black ....each	$0.10	$0.10	$0.10	$0.12	$0.15	$0.25	$0.30	$0.40	$0.60
Galvanized ..... "	.14	.14	.14	.16	.21	.37	.46	.57	.85
Size ....inches	**3**	**3½**	**4**	**4½**	**5**	**6**	**7**	**8**	**10**
Black ....each	$0.80	$1.30	$1.50	$2.00	$2.40	$2.80	$3.85	$4.00	$6.00
Galvanized ..... "	1.15	1.90	2.15	2.85	3.45	4.00	5.55	5.80	8.75

Tubing and line pipe couplings carried in stock in black only.

Wrought Fittings

DRIVE PIPE COUPLINGS

WITH PATENT SLEEVE

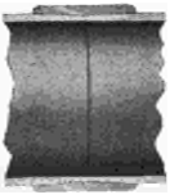


Fig. 422

Fig. 423

Size ....inches	4	4½	4½	5	6	7	8	9	10	12
Number threads per inch.......	8	8	10	8	8	8	8	8	8	8
Black ....each	$1.50	$2.00	$4.00	$2.40	$2.80	$3.85	$4.00	$5.00	$6.00	$ 8.00
Galvanized .... "	2.15	2.85	5.80	3.45	4.00	5.55	5.80	7.25	8.75	11.15

The 4½-inch 10-thread couplings are for use on "Coalinga Special" drive pipe.
Drive pipe couplings carried in stock in black only.

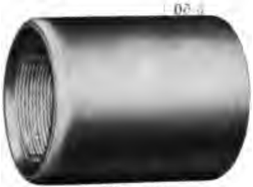


Fig. 424

DRILL PIPE COUPLINGS

WITH PATENT SLEEVE
8 THREADS PER INCH

Size ....inches	2½	4	5	6
Black ....each	$0.95	$2.25	$3.30	$4.75

CASING COUPLINGS

WITH PATENT SLEEVE

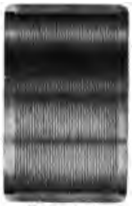


Fig. 425

FOR IRRIGATION AND STANDARD WEIGHT CASING

Size ....inches	2¾	3	3¼	3½	3¾	4	4¼	4½	4¾	5	5⅝	6¼
Black ....each	$0.30	.35	.40	.46	.52	.60	.68	.74	.80	.90	1.20	1.35
Galvanized .... "	.42	.50	.57	.65	.73	.85	1.00	1.05	1.15	1.30	1.70	1.90
Size ....inches	6⅝	7⅝	8¼	8⅝	9⅝	10⅝	11⅝	12½	13½	14½	15½	....
Black ....each	$1.50	1.75	2.25	2.85	3.50	4.50	5.15	6.75	7.60	8.75	10.00	....
Galvanized .... "	2.15	2.50	3.25	3.75	5.00	6.15	6.95	8.85	10.15	11.75	13.15	....

Carried in stock in black only.

CASING COUPLINGS

WITH PATENT SLEEVE
10 THREADS PER INCH
FOR "COALINGA SPECIAL" CASING

Size ....inches	4½	5⅝	6¼	6⅝	7⅝	8¼	9⅝	10	11⅝	12½	13½	15½
Black ....each	$1.48	2.40	2.70	3.00	3.50	4.50	7.00	9.00	10.30	13.50	15.20	20.00

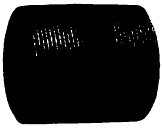
Wrought Fittings

WROUGHT NIPPLES

BLACK

THREADED RIGHT HAND

Close
Fig. 426



Shoulder or Short
Fig. 427

LENGTH—INCHES						Sizes	PRICES		PRICES OF EXTRA LONG NIPPLES								
									LENGTH—INCHES								
Close	Short	LONG					Close or Short	Long	4	5	6	7	8	9	10	11	12
3/4	1 1/2	2	2 1/2	3	3 1/2	1/8	$0.04	.06	.07	.08	.10	.12	.14	.15	.17	.18	.19
7/8	1 1/2	2	2 1/2	3	3 1/2	1/4	.04	.06	.07	.08	.10	.12	.14	.15	.17	.18	.19
1	1 1/2	2	2 1/2	3	3 1/2	3/8	.04	.06	.07	.08	.10	.12	.14	.15	.17	.18	.19
1 1/8	1 1/2	2	2 1/2	3	3 1/2	1/2	.05	.07	.08	.10	.12	.14	.16	.18	.20	.22	.23
1 3/8	2	2 1/2	3	3 1/2	4	3/4	.06	.09	...	.11	.13	.17	.18	.20	.22	.24	.26
1 1/2	2	2 1/2	3	3 1/2	4	1	.08	.13	...	.15	.18	.23	.25	.28	.31	.34	.36
1 5/8	2 1/2	3	3 1/2	4	4 1/2	1 1/4	.11	.17	...	.20	.24	.29	.33	.36	.40	.44	.47
1 3/4	2 1/2	3	3 1/2	4	4 1/2	1 1/2	.13	.20	...	.25	.29	.36	.40	.45	.50	.54	.59
2	2 1/2	3	3 1/2	4	4 1/2	2	.18	.27	...	.32	.38	.50	.54	.59	.65	.72	.77
2 1/2	3	3 1/2	4	4 1/2	5	2 1/2	.39	.59	...	...	.68	.90	.97	1.06	1.17	1.26	1.35
2 1/2	3	3 1/2	4	4 1/2	5	3	.48	.72	...	...	.85	1.08	1.20	1.33	1.45	1.58	1.70
2 3/4	4	4 1/2	5	5 1/2	6	3 1/2	.75	1.05	...	...	...	1.30	1.45	1.60	1.75	1.90	2.05
3	4	4 1/2	5	5 1/2	6	4	.85	1.20	...	...	...	1.52	1.69	1.87	2.05	2.22	2.40
3	4	4 1/2	5	5 1/2	6	4 1/2	1.25	1.70	...	...	...	2.25	2.50	2.75	2.95	3.17	3.40
3 1/2	4 1/2	5	5 1/2	6	6 1/2	5	1.55	2.45	...	...	...	2.58	2.83	3.10	3.35	3.60	3.85
3 1/2	4 1/2	5	5 1/2	6	6 1/2	6	1.85	2.90	...	...	...	3.05	3.35	3.70	4.00	4.30	4.65
4	5	6	..	..	..	7	3.20	3.60	...	...	...	4.05	4.45	4.90	5.30	5.75	6.15
4	5	6	..	..	..	8	3.55	4.05	...	...	...	4.55	5.05	5.50	6.00	6.50	7.00
5	6	8	..	..	..	9	5.25	6.50	...	...	...	...	...	7.10	7.75	8.40	9.00
5	6	8	..	..	..	10	6.75	8.25	...	...	...	...	...	8.90	9.70	10.40	11.15
5	6	8	..	..	..	12	8.00	10.00	...	...	...	...	...	10.80	11.75	12.70	13.65

Assorted close and short nipples will always be furnished unless otherwise specified.
Nipples made to order from extra strong pipe, at double above list.
In ordering nipples, always state lengths preferred.

BLACK

THREADED RIGHT AND LEFT

LENGTH—INCHES						Sizes	PRICES		PRICES OF EXTRA LONG R. AND L. NIPPLES								
									LENGTH—INCHES								
Close	Short	LONG					Close or Short	Long	4	5	6	7	8	9	10	11	12
3/4	1 1/2	2	2 1/2	3	3 1/2	1/8	$0.05	.08	.09	.11	.13	.16	.18	.20	.23	.25	.27
7/8	1 1/2	2	2 1/2	3	3 1/2	1/4	.05	.08	.09	.11	.13	.16	.18	.20	.23	.25	.27
1	1 1/2	2	2 1/2	3	3 1/2	3/8	.05	.08	.09	.11	.13	.16	.18	.20	.23	.25	.27
1 1/8	1 1/2	2	2 1/2	3	3 1/2	1/2	.07	.10	.11	.13	.16	.18	.21	.24	.27	.29	.31
1 3/8	2	2 1/2	3	3 1/2	4	3/4	.08	.12	...	.15	.17	.23	.25	.27	.29	.32	.35
1 1/2	2	2 1/2	3	3 1/2	4	1	.11	.18	...	.20	.24	.31	.33	.37	.41	.45	.48
1 5/8	2 1/2	3	3 1/2	4	4 1/2	1 1/4	.15	.23	...	.27	.32	.39	.45	.50	.55	.60	.65
1 3/4	2 1/2	3	3 1/2	4	4 1/2	1 1/2	.18	.27	...	.34	.39	.48	.52	.60	.67	.72	.80
2	2 1/2	3	3 1/2	4	4 1/2	2	.24	.36	...	.43	.51	.67	.72	.80	.87	.96	1.03
2 1/2	3	3 1/2	4	4 1/2	5	2 1/2	.52	.79	...	...	.91	1.20	1.30	1.40	1.55	1.68	1.80
2 1/2	3	3 1/2	4	4 1/2	5	3	.65	.96	...	...	1.13	1.44	1.60	1.77	1.93	2.10	2.27
2 3/4	4	4 1/2	5	5 1/2	6	3 1/2	1.00	1.40	...	...	...	1.75	1.95	2.15	2.35	2.55	2.75
3	4	4 1/2	5	5 1/2	6	4	1.15	1.60	...	...	...	2.00	2.25	2.50	2.75	3.00	3.25

Assorted right and left nipples will be furnished long unless otherwise specified.
Add 60 per cent to above prices for galvanized nipples threaded right and left.

Wrought Fittings

WROUGHT NIPPLES

GALVANIZED

THREADED RIGHT HAND

LENGTH—INCHES							PRICES		PRICES OF EXTRA LONG NIPPLES								
									LENGTH—INCHES								
Close	Short	LONG				Sizes	Close or Short	Long	4	5	6	7	8	9	10	11	12
¾	1½	2	2½	3	3½	⅛	$0.06	.11	.12	.15	.17	.21	.24	.26	.29	.31	.34
⅞	1½	2	2½	3	3½	¼	.06	.11	.12	.15	.17	.21	.24	.26	.29	.31	.34
1	1½	2	2½	3	3½	⅜	.06	.11	.12	.15	.17	.21	.24	.26	.29	.31	.34
1⅛	1½	2	2½	3	3½	½	.06	.11	.13	.16	.18	.23	.26	.28	.31	.33	.36
1⅜	2	2½	3	3½	4	¾	.08	.14	...	.18	.21	.26	.29	.32	.35	.38	.41
1½	2	2½	3	3½	4	1	.11	.19	...	.24	.28	.34	.38	.42	.47	.51	.55
1⅝	2½	3	3½	4	4½	1¼	.17	.29	...	.32	.38	.45	.51	.57	.63	.69	.75
1¾	2½	3	3½	4	4½	1½	.21	.35	...	.39	.46	.55	.63	.70	.77	.84	.91
2	2½	3	3½	4	4½	2	.27	.47	...	.52	.61	.74	.83	.93	1.03	1.13	1.23
2½	3	3½	4	4½	5	2½	.56	.86	...	...	1.00	1.26	1.41	1.56	1.71	1.86	2.01
2½	3	3½	4	4½	5	3	.70	1.10	...	...	1.30	1.60	1.80	2.00	2.20	2.40	2.60
2¾	4	4½	5	5½	6	3½	1.20	1.70	...	...	...	2.10	2.35	2.60	2.85	3.15	3.40
3	4	4½	5	5½	6	4	1.35	1.87	...	...	...	2.30	2.60	2.90	3.20	3.50	3.80
3	4	4½	5	5½	6	4½	1.85	2.60	...	...	...	3.30	3.65	4.05	4.45	4.85	5.25
3½	4½	5	5½	6	6½	5	2.30	3.15	...	...	...	3.75	4.20	4.60	5.00	5.40	5.85
3½	4½	5	5½	6	6½	6	2.80	4.25	...	...	...	4.50	5.00	5.55	6.05	6.60	7.15
4	5	6	..	..	..	7	4.25	4.95	...	...	...	5.65	6.35	7.05	7.75	8.45	9.20
4	5	6	..	..	..	8	5.00	5.80	...	...	...	6.65	7.50	8.35	9.25	10.10	10.95

Assorted close and short nipples will always be furnished unless otherwise specified.
To obtain lists on extra heavy galvanized nipples, take the difference between the black and galvanized list and add double the black list.

CASING NIPPLES

Fig. 428

Size ....inches	3	3¼	3½	3¾	4	4¼	4½	4¾	5
Close or short...each	$1.90	$1.95	$2.30	$2.35	$2.35	$2.40	$2.40	$2.45	$2.55
Long .... "	2.00	2.10	2.45	2.50	2.50	2.60	2.60	2.70	2.85
6 inches long... "	2.05	....	....	....	....	....	....	....	....
7 inches long... "	2.10	2.15	2.50	2.60	2.60	2.70	2.70	2.80	2.95
8 inches long... "	2.15	2.20	2.60	2.65	2.75	2.80	2.80	2.95	3.10
9 inches long... "	2.25	2.30	2.65	2.75	2.80	2.90	2.90	3.05	3.25
10 inches long... "	2.30	2.35	2.70	2.85	2.90	3.00	3.00	3.15	3.40
11 inches long... "	2.35	2.40	2.80	2.90	3.00	3.05	3.10	3.25	3.55
12 inches long... "	2.40	2.50	2.85	3.00	3.10	3.15	3.20	3.35	3.65
Size ....inches	5⅝	6¼	6⅝	7⅝	8¼	8⅝	9⅝	10⅝	11⅝
Close or short...each	$3.25	$3.45	$4.50	$4.50	$5.25	$6.45	$7.10	....	....
Long .... "	3.50	....	....	....	....	....	....	....	....
6 inches long... "	....	3.80	4.75	4.80	5.45	....	....	....	9.50
7 inches long... "	3.65	4.00	5.00	5.05	5.70	6.70	7.45	8.15	10.00
8 inches long... "	3.80	4.20	5.25	5.30	5.95	7.00	7.80	8.60	10.50
9 inches long... "	3.95	4.35	5.45	5.55	6.20	7.30	8.15	8.95	11.00
10 inches long... "	4.10	4.55	5.70	5.80	6.45	7.60	8.50	9.50	11.50
11 inches long... "	4.25	4.75	5.95	6.05	6.70	7.90	8.85	9.85	12.50
12 inches long... "	4.40	4.95	6.20	6.30	6.95	8.20	9.20	10.20	13.75

Casing nipples over twelve inches long, charge net price of casing and two threads.
In ordering casing nipples, always specify number of threads to the inch.
Casing substitute nipples take same list as above.

Wrought Fittings

REDUCING OR SWAGED NIPPLES

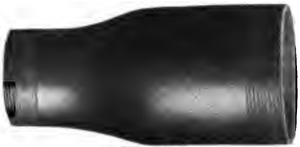


Fig. 429

PIPE SIZES

Size, Inches	Weight, Pounds	Price, Each	Size, Inches	Weight, Pounds	Price, Each	Size, Inches	Weight, Pounds	Price, Each
1 x ¾	1¼	$1.00	4½x4	10	$3.00	8x 4¼	28	$11.00
2 x1	2¼	1.50	5 x2	12	4.50	8x 5	28	10.00
2 x1¼	2¼	1.40	5 x2½	12	4.25	8x 5⅝	28	9.00
2 x1½	2½	1.25	5 x3	12	4.00	8x 6	29½	9.00
2½x1½	3	1.75	5 x3½	12	3.75	8x 6¼	28	9.00
2½x2	3¼	1.50	5 x4	12½	3.50	8x 6⅝	28	8.50
3 x1	4	3.00	5 x4½	13	3.50	10x 2	53	25.00
3 x1½	4¼	2.75	6 x2	15	6.50	10x 3	53	21.50
3 x2	4½	1.85	6 x2½	16	6.25	10x 4	53	19.00
3 x2½	4½	1.75	6 x3	16	5.25	10x 6	53	15.00
3½x2	6	2.75	6 x3½	16	5.00	10x 6¼	53	15.75
3½x2½	6	2.50	6 x4	16	4.75	10x 8	53	14.00
3½x3	6	2.25	6 x4½	16	4.75	10x 8¼	53	14.00
4 x1	8	4.50	6 x5	16	4.50	12x 2	72	60.00
4 x2	8	3.00	6 x5⅝	18¾	6.00	12x 3	72	45.00
4 x2½	8½	2.75	7 x4	23¼	7.50	12x 4	72	40.00
4 x3	8½	2.50	7 x5	23¼	7.25	12x 6	72	35.00
4 x3½	8½	2.50	7 x6	23¼	7.00	12x 8	72	30.00
4½x2	9	3.75	8 x2	27¼	15.00	12x10	72	25.00
4½x2½	9	3.50	8 x3	27½	12.00			
4½x3	9	3.25	8 x4	28	10.50			

CASING SIZES

Size, Inches	Weight, Pounds	Price, Each	Size, Inches	Weight, Pounds	Price, Each	Size, Inches	Weight, Pounds	Price, Each
4 x3	8	$4.00	5⅝x3	12½	$6.50	6⅝x6¼	17	$7.00
4¼x2	8½	4.75	5⅝x4	12½	6.25	7⅝x5⅝	20	9.50
4¼x2½	8½	4.50	5⅝x4¼	12½	6.25	7⅝x6	20	9.00
4¼x3	8½	4.50	5⅝x5	12½	6.00	8¼x2	24	15.00
4¼x3½	8½	4.50	6¼x2	16	7.25	8¼x3	24	12.00
4¼x3¾	8½	4.50	6¼x3	17¾	6.75	8¼x4	24	11.50
4½x2	9¼	4.75	6¼x4	16¾	6.50	8¼x5	24	11.00
4½x3	9¼	4.50	6¼x4¼	13	6.50	8¼x5⅝	24	9.00
4½x4	9¼	4.50	6¼x5	13	6.00	8¼x6	24	9.00
5 x2	11¾	5.50	6¼x5⅝	13	6.00	8¼x6¼	24	9.00
5 x3	12½	5.00	6⅝x2	17	8.00	8¼x6⅝	24	9.00
5 x3½	12½	5.00	6⅝x3	17	7.50	11⅝x4	....	55.00
5 x4	13	4.50	6⅝x4	17	7.50	11⅝x8	....	30.00
5 x4¼	13	4.50	6⅝x5	17	7.50			
5⅝x2	12½	7.00	6⅝x6	17	7.00			

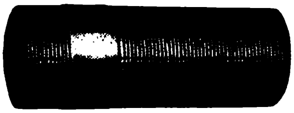


Fig. 430

LOCKNUT OR TANK NIPPLES

List same as Standard Nipples. These nipples up to 2 inches inclusive, always furnished 6 inches long unless otherwise specified.

The length on 2½ inches and larger must be specified.

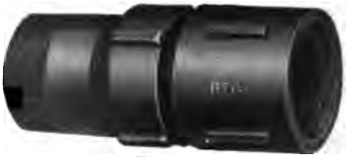


Fig. 431

LONG SCREWS

WITH COUPLING AND FOLLOWER FACED

MADE FROM EXTRA STRONG PIPE

Size ....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Standard length.........inches	2½	3	3½	4	4½	5	5½	6	7	8	8½	9
Black ....each	$0.30	.35	.40	.55	.75	1.00	1.30	1.70	2.70	3.70	5.40	6.60
Galvanized .... "	.35	.40	.50	.66	1.00	1.25	1.60	2.10	3.10	4.70	6.75	8.25

Long screws are furnished with malleable ribbed couplings and followers unless otherwise specified, except 2½-inch and larger, which will be wrought.

Malleable Iron Fittings

CLASSIFICATION AND LIST

ADOPTED JUNE 5, 1907

Class	A	B	*C
Black, per pound	40	20	12
Galvanized, per pound	50	28	19
Elbows	⅛x⅛ ¼x⅛ ⅜x⅛	⅜x¼ ½x¼ ¼, ⅜, ½ ½x⅜	¾ and larger
Elbows, R. & L.	¼, ⅜	½, ¾, 1	1¼ and larger
" 45°, 60°, 22½°, 11¼°		2 and smaller	2½ and larger
" Street		¼ to 1x¾ inclusive	1 and larger
" " 45°		½	
" Side Outlet		all sizes	
" Drop		all sizes	
Tees	⅛x⅛ ⅛x¼ ¼x⅛ ⅜x⅛	¼, ⅜, ½ ¼x⅜ ⅜x¼x¼ ⅜x⅜x¼ ⅜x½x⅜ ½ reducing	¾ and larger
Tees, Four-way		all sizes	
" Drop		all sizes	
" Service		½, ¾ 1x¾x1	1 and larger
" " Male Branch		1x1x¾	1 and larger
Crosses		¼ to 1 inclusive	1¼ and larger
" Reducing		1 and smaller	1¼ and larger
Return Bends		⅜ to 1 inclusive	1¼ and larger
" " R. & L.	⅜, ½	¾ and larger	
Couplings, R. H.		¼ to ¾ inclusive	1 and larger
" R. & L.		¼ to ¾ inclusive	1 and larger
Reducers	¼x⅛ ⅜x⅛	⅜x¼ to 1x¾ inclusive	1¼ and larger
Caps		¼ to 1 inclusive	1¼ and larger
Locknuts		¼ to 1¼ inclusive	1½ and larger
Extension Pieces		all sizes	
Waste Nuts		all sizes	
Chandelier Hooks		all sizes	
" Loops		all sizes	
Wall Plates		all sizes	
Y Branches, 45°, 60°, Double		all sizes	

*Fittings in Class C having one or more openings smaller than ¾ to be Class B.

The size of the smallest opening determines the classification.

In ordering, be particular to state whether beaded or plain.

An extra charge will be made for fittings not enumerated in standard list.

Malleable Iron Fittings

LIST PRICES

PACIFIC COAST PIECE LIST
ADOPTED FEB. 1, 1911—SUPERSEDING ALL PREVIOUS LISTS

STANDARD ELBOWS

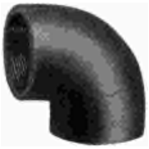


Fig. 432—Plain

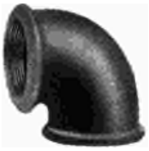


Fig. 433—Beaded

Size .... inches	⅛	¼	⅜	½	¾	1	1¼	1½
Black, plain, straight .... each	$0.12	$0.10	$0.14	$0.16	$0.15	$0.27	$0.44	$0.49
Black, plain, reducing .... "	.....	.20	.18	.21	.32	.35	.56	.63
Black, beaded, straight .... "	.13	.11	.16	.19	.18	.30	.48	.60
Black, beaded, reducing .... "	.....	.22	.20	.24	.36	.40	.60	.70
Black, beaded, R. and L......... "	.....	.34	.38	.30	.48	.80	.72	1.00
Galvanized, plain, straight .... "	.16	.15	.23	.25	.25	.45	.72	.80
Galvanized, plain, reducing ...... "	.....	.28	.28	.32	.48	.58	.95	1.03
Galvanized, beaded, straight ..... "	.18	.16	.24	.28	.28	.50	.78	1.00
Galvanized, beaded, reducing .... "	.....	.30	.29	.36	.54	.64	1.00	1.20
Galvanized, beaded, R. and L..... "	.....	.45	.55	.47	.70	1.20	1.20	1.65

Size .... inches	2	2½	3	3½	4	4½	5	6
Black, plain, straight .... each	$0.86	.....	.....	.....	.....	.....	.....	.....
Black, plain, reducing .... "	1.10	.....	.....	.....	.....	.....	.....	.....
Black, beaded, straight .... "	1.00	$2.00	$3.00	$4.00	$6.50	$9.00	$15.00	$20.00
Black, beaded, reducing .... "	1.30	2.50	3.75	4.80	8.00	11.00	18.00	24.00
Black, beaded, R. and L......... "	1.80	.....	.....	.....	.....	.....	.....	.....
Galvanized, plain, straight .... "	1.43	.....	.....	.....	.....	.....	.....	.....
Galvanized, plain, reducing ...... "	1.85	.....	.....	.....	.....	.....	.....	.....
Galvanized, beaded, straight ..... "	1.70	3.50	5.00	6.65	10.75	15.00	25.00	33.00
Galvanized, beaded, reducing .... "	2.20	4.40	6.20	8.00	13.50	18.50	30.00	40.00
Galvanized, beaded, R. and L..... "	3.00	.....	.....	.....	.....	.....	.....	.....

STANDARD 45° ELBOWS

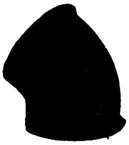


Fig. 434—Beaded

Size .... inches	⅛	¼	⅜	½	¾	1	1¼	1½
45° Black, plain .... each	.....	$0.08	$0.10	$0.15	$0.26	$0.38	$0.70	$0.80
45° Black, beaded .... "	.....	.08	.10	.17	.28	.42	.80	.90
45° Galvanized, plain .... "	.....	.12	.15	.24	.38	.56	1.05	1.20
45° Galvanized, beaded .... "	.....	.12	.17	.25	.42	.64	1.20	1.30

Size .... inches	2	2½	3	3½	4	4½	5	6
45° Black, plain .... each	$1.25	.....	.....	.....	.....	.....	.....	.....
45° Black, beaded .... "	1.30	2.10	2.90	4.00	5.80	6.30	7.80	12.00
45° Galvanized, plain .... "	1.85	.....	.....	.....	.....	.....	.....	.....
45° Galvanized, beaded .... "	2.00	3.50	4.80	6.70	9.70	10.50	13.00	19.00

The list on all malleable fittings, ⅜ inch or ½ inch reducing to ⅛ inch, will be double the reducing list.

The list on all malleable fittings, 1 inch and larger reducing to ½ inch or smaller, will be double the reducing list.

Malleable Iron Fittings

STANDARD STREET ELBOWS

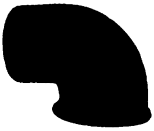


Fig. 435

Size ....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3	4
Black, straight ....each	$0.10	.14	.22	.38	.38	.57	.68	1.30	2.50	4.30	10.00
Black, reducing .... "	....	...	...	.44	.70	.70	.85	1.60	3.00	5.20	12.00
Galvanized, straight .... "	.15	.21	.32	.58	.64	.95	1.15	2.20	4.20	7.20	17.00
Galvanized, reducing .... "	....	...	...	.64	1.02	1.15	1.40	2.70	5.00	8.60	20.00

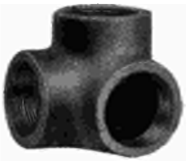


Fig. 436

STANDARD SIDE OUTLET ELBOWS

Size ....inches	⅜	½	¾	1	1¼	1½	2
Black, straight ....each	$0.17	.27	.48	.77	1.15	1.45	2.50
Black, reducing .... "	.20	.32	.58	.92	1.38	...	...
Galvanized, straight ...... "	.27	.39	.71	1.15	1.70	2.10	3.70
Galvanized, reducing ..... "	.32	.47	.85	1.35	2.00	...	...

STANDARD FEMALE DROP ELBOWS

Size ....inches	¼	⅜	½	¾	1
Black, straight ....each	$0.15	$0.19	$0.25	$0.46	$0.80
Black, reducing .... "	....	.23	.30	.55	.96
Galvanized, straight .... "	.22	.28	.36	.67	1.20
Galvanized, reducing .... "	....	.34	.44	.81	1.40

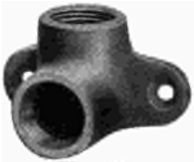


Fig. 437

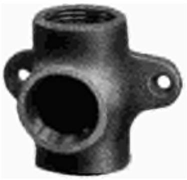


Fig. 438

STANDARD FEMALE DROP TEES

Size ....inches	¼	⅜	½	¾	1
Black, straight ....each	$0.15	$0.22	$0.34	$0.55	$0.75
Black, reducing .... "	....	.26	.40	.66	.90
Galvanized, straight .... "	.22	.32	.50	.80	1.15
Galvanized, reducing .... "	....	.40	.60	1.00	1.35

STANDARD SIDE OUTLET OR FOUR-WAY TEES

Size ....inches	⅜	½	¾	1	1¼	1½	2
Black ....each	$0.23	$0.36	$0.47	$0.85	$1.40	$2.00	$3.20
Galvanized .... "	.34	.53	.70	1.25	2.00	2.80	4.70

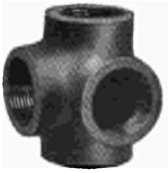


Fig. 439

The list on all malleable fittings, ⅜ inch or ½ inch reducing to ⅛ inch, will be double the reducing list.

The list on all malleable fittings, 1 inch and larger reducing to ½ inch or smaller, will be double the reducing list.

Malleable Iron Fittings

STANDARD TEES

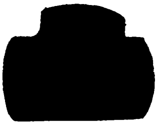


Fig. 440—Plain

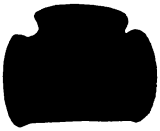


Fig. 441—Beaded

In describing Tees the run is first named, then the outlet, thus:

½ T ⅜=½×⅜×¾
¾

Size ....inches	⅛	¼	⅜	½	¾	1	1¼	1½
Black, plain, straight ....each	$0.16	$0.12	$0.20	$0.22	$0.20	$0.32	$0.50	$0.72
Black, plain, reducing .... "	.....	.23	.24	.28	.43	.40	.65	.95
Black, beaded, straight .... "	.18	.14	.22	.25	.23	.35	.60	.80
Black, beaded, reducing .... "	.....	.27	.26	.33	.48	.45	.77	1.00
Galvanized, plain, straight .... "	.23	.18	.29	.32	.34	.53	.85	1.20
Galvanized, plain, reducing ...... "	.....	.32	.35	.40	.65	.68	1.05	1.55
Galvanized, beaded, straight ..... "	.25	.20	.32	.37	.38	.58	1.00	1.35
Galvanized, beaded, reducing .... "	.....	.40	.40	.48	.72	.74	1.30	1.70

Size ....inches	2	2½	3	3½	4	4½	5	6
Black, plain, straight ....each	$1.20	.....	.....	.....	.....	.....	.....	.....
Black, plain, reducing .... "	1.50	.....	.....	.....	.....	.....	.....	.....
Black, beaded, straight .... "	1.35	2.40	3.70	4.80	7.50	10.00	16.00	23.00
Black, beaded, reducing .... "	1.75	3.00	4.60	6.00	9.30	12.00	19.00	28.00
Galvanized, plain, straight .... "	2.00	.....	.....	.....	.....	.....	.....	.....
Galvanized, plain, reducing ...... "	2.50	.....	.....	.....	.....	.....	.....	.....
Galvanized, beaded, straight ..... "	2.35	4.00	6.10	8.00	12.50	17.00	27.00	38.00
Galvanized, beaded, reducing .... "	2.90	5.00	7.60	10.00	15.50	20.00	32.00	46.00

STANDARD CROSSES

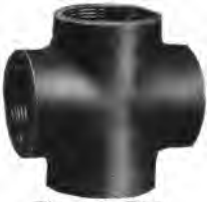


Fig. 442—Plain

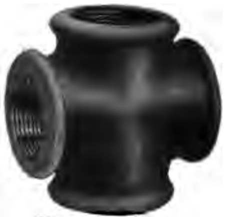


Fig. 443—Beaded

Size ....inches	⅛	¼	⅜	½	¾	1	1¼	1½
Black, plain, straight ....each	$0.29	$0.15	$0.21	$0.38	$0.53	$0.90	$0.90	$1.10
Black, plain, reducing .... "	.....	.....	.25	.46	.64	1.10	1.10	1.35
Black, beaded, straight .... "	.....	.....	.28	.42	.60	.95	1.00	1.20
Black, beaded, reducing .... "	.....	.....	.....	.....	.....	1.15	1.20	1.40
Galvanized, plain, straight .... "	.38	.22	.31	.56	.80	1.30	1.50	1.80
Galvanized, plain, reducing ...... "	.....	.....	.37	.67	.95	1.55	1.80	2.20
Galvanized, beaded, straight ..... "	.....	.....	.40	.62	.90	1.40	1.65	2.20
Galvanized, beaded, reducing .... "	.....	.....	.....	.....	.....	1.70	2.00	2.40

Size ....inches	2	2½	3	3½	4	4½	5	6
Black, plain, straight ....each	$1.85	.....	.....	.....	.....	.....	.....	.....
Black, plain, reducing .... "	2.20	.....	.....	.....	.....	.....	.....	.....
Black, beaded, straight .... "	2.00	3.60	6.00	6.60	11.50	.....	17.50	25.00
Black, beaded, reducing .... "	2.50	4.30	7.30	8.00	14.00	.....	.....	.....
Galvanized, plain, straight .... "	3.00	.....	.....	.....	.....	.....	.....	.....
Galvanized, plain, reducing ...... "	3.70	.....	.....	.....	.....	.....	.....	.....
Galvanized, beaded, straight ..... "	3.50	6.00	10.00	11.00	19.00	.....	29.00	42.00
Galvanized, beaded, reducing .... "	4.00	7.20	12.00	13.00	23.00	.....	.....	.....

The list on all malleable fittings, ⅜ inch or ½ inch reducing to ⅛ inch, will be double the reducing list.

The list on all malleable fittings, 1 inch and larger reducing to ½ inch or smaller, will be double the reducing list.

Malleable Iron Fittings

STANDARD REDUCERS

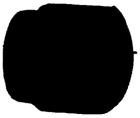


Fig. 444—Plain

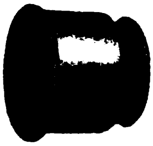


Fig. 445—Beaded

Size ....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Black ....each	$0.14	.12	.18	.25	.40	.40	.52	.90	1.60	2.40	3.20	4.00
Galvanized .... "	.20	.18	.27	.38	.60	.70	.86	1.45	2.60	4.00	5.40	6.75

STANDARD Y-BRANCHES

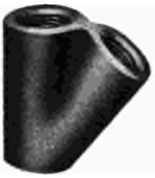


Fig. 446—Plain

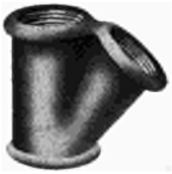
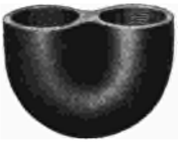


Fig. 447—Beaded

Size ....inches	½	¾	1	1¼	1½
Black, plain, straight or reducing.............each	$0.32	$0.70	$0.75	$1.15	$1.70
Black, beaded, straight or reducing........... "	.35	.75	.80	1.35	1.85
Galvanized, plain, straight or reducing .... "	.46	1.00	1.10	1.70	2.50
Galvanized, beaded, straight or reducing...... "	.52	1.10	1.20	2.00	2.75
Size ....inches	**2**	**2½**	**3**	**3½**	**4**
Black, plain, straight or reducing.............each	$2.10	$5.40	$10.00	....	....
Black, beaded, straight or reducing........... "	2.75	6.50	12.00	14.00	18.00
Galvanized, plain, straight or reducing......... "	3.10	8.00	15.00	....	....
Galvanized, beaded, straight or reducing...... "	4.30	9.50	18.00	21.00	27.00

STANDARD RETURN BENDS

CLOSE PATTERN

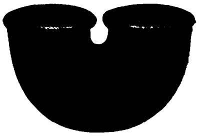


Plain—Close Pattern
Fig. 448

Size ....inches Distance between centers......	½ 1	¾ 1¼	1 1½	1¼ 1¾	1½ 2 3/16	2 2⅝
Black, right hand ....each	$0.44	$0.50	$0.95	$1.25	$1.55	$2.25
Black, right and left...... "	.90	.50	.95	2.10	2.55	3.75
Galvanized, right hand .... "	.70	.75	1.40	2.10	2.50	3.95
Galvanized, right and left.. "	1.25	.75	1.40	3.10	3.75	5.50

MEDIUM PATTERN

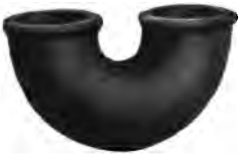
Size ....inches Distance between centers......	½ 1¼	¾ 1½	1 1⅞	1¼ 2¼	1½ 2½	2 3
Black, right hand ....each	$0.50	$0.55	$1.05	$1.40	$1.70	$2.50
Black, right and left...... "	1.00	.55	1.05	2.30	2.75	4.25
Galvanized, right hand .... "	.72	.80	1.50	2.30	2.80	4.25
Galvanized, right and left.. "	1.30	.80	1.50	3.35	4.10	6.25



Beaded—Medium Pattern
Fig. 449

OPEN PATTERN

Size ....inches Distance between centers...........	½ 1½	¾ 2	1 2½	1¼ 3
Black, right hand ....each	$0.54	$0.67	$1.15	$1.50
Black, right and left........... "	1.10	.70	1.15	2.50
Galvanized, right hand .... "	.80	1.00	1.65	2.50
Galvanized, right and left...... "	1.40	1.00	1.65	3.70
Size ....inches Distance between centers...........	**1½ 3½**	**2 4**	**2½ 4½**	**3 5**
Black, right hand ....each	$2.65	$3.40	$5.00	$ 7.50
Black, right and left........... "	4.40	5.65	8.50	12.50
Galvanized, right hand .... "	4.35	5.65	8.50	12.50
Galvanized, right and left...... "	6.50	8.50	12.50	18.00



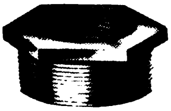
Beaded—Open Pattern
Fig. 450

The list on all malleable fittings, ⅜ inch or ½ inch reducing to ¼ inch, will be double the reducing list.

The list on all malleable fittings, 1 inch and larger reducing to ½ inch or smaller, will be double the reducing list.

Malleable Iron Fittings

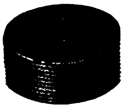
MALLEABLE BUSHINGS


Bushing—Fig. 451

Reduce one size only. Bushings larger than 2½-inch are made of cast iron only.

Bushings reducing two or more sizes are made of cast iron only.

The list price of bushings is determined by the male thread size.


Faced Bushing—Fig. 452

Size ....inches	¼	⅜	½	¾	1	1¼	1½	2	2½
Black ....each	$0.04	$0.04	$0.04	$0.05	$0.06	$0.07	$0.09	$0.14	$0.21
Galvanized ..... "	.08	.08	.08	.10	.12	.14	.18	.28	.42
Faced .... "	....	.08	.09	.11	.13	.17	.22	.32	.48

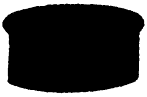
For larger sizes, see Cast Iron Fittings.

Fig. 453

LOCKNUTS

Size ....inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
lack ....each	$0.07	.05	.06	.10	.20	.28	.38	.38	.54	.90	1.20	1.80	2.20
Galvanized .... "	.12	.08	.10	.15	.30	.42	.57	.52	.89	1.45	1.90	3.20	3.60

STANDARD CAPS


Beaded—Fig. 454

Size ....inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Black ....each	$0.10	07	.10	.12	.20	.26	.38	.45	.75	1.20	1.80	2.20	3.00	4.80	7.20
Galvanized ..... "	.15	.11	.15	.18	.28	.38	.65	.75	1.20	2.00	3.00	3.50	5.00	8.00	12.00

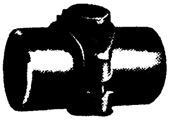


Fig. 455

WATER PIPE CLAMPS

SINGLE STRAP

FOR STANDARD WROUGHT PIPE, CASING, AND SHEET IRON PIPE

Number	Clamps Will Fit			Size of Wrought Pipe Connections Pipe Clamps Are Tapped For, Inches	Price, Each	Number	Clamps Will Fit			Size of Wrought Pipe Connections Pipe Clamps Are Tapped For, Inches	Price, Each
	Outside Diameter of Circle, Inches	Size Wrought Pipe, Inches	Outside Diameter of Casing, Inches				Outside Diameter of Circle, Inches	Size Wrought Pipe, Inches	Outside Diameter of Casing, Inches		
1	2⅜	2	2½	½ to 1¼	$1.00	17	6	.....	6	2	$2.40
2	2⅞	2½	2¾&3	1 to 1¼	1.25	18	6	.....	6	3	4.50
3	3½	3	3½	¾ and 1	1.25	19	6⅝	6	6⅝	¾ to 1½	2.25
4	3½	3	3½	1¼ to 2	1.50	20	6⅝	6	6⅝	2	2.50
5	4	3½	4	¾ to 1	1.50	21	6⅝	6	6⅝	3	5.00
6	4	3½	4	1¼ to 2	1.75	22	7	.....	7	¾ to 1½	2.50
7	4½	4	4½	¾ to 1½	1.75	23	7	.....	7	2	2.70
8	4½	4	4½	2	2.00	24	7	.....	7	3	5.00
9	4½	4	4½	3	4.00	25	7⅝	7	7⅝	¾ to 1½	2.50
10	5	4½	5	¾ to 1½	1.80	26	7⅝	7	7⅝	2	2.70
11	5	4½	5	2	2.15	27	7⅝	7	7⅝	3	5.00
12	5	4½	5	3	4.00	28	8	.....	8	¾ to 1½	4.50
13	5½	5	5½	¾ to 1½	1.80	29	8	.....	8	2	5.00
14	5½	5	5½	2	2.15	30	8	.....	8	3	5.50
15	5½	5	5½	3	4.00	30½	8⅝	8	8⅝	¾ to 1½	5.50
16	6	.....	6	¾ to 1½	2.00	31	8⅝	8	8⅝	2 to 3	5.50
						32	8⅝	8	8⅝	4	6.00

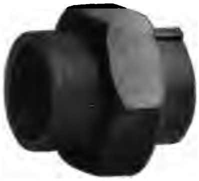


Fig. 456

Malleable Iron Fittings

STANDARD MALLEABLE IRON UNIONS

Size ....inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Black ....each	$0.18	.18	.20	.22	.27	.33	.46	.58	.75	1.55	2.10	3.65	4.35
Galvanized .... "	.27	.27	.30	.33	.40	.50	.70	.90	1.15	2.35	3.15	5.50	6.50

TWO-THIRD UNIONS

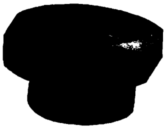


Fig. 457

Size ....inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Black ....each	$0.12	.12	.14	.16	.19	.22	.30	.40	.50	1.00	1.40	2.40	3.00
Galvanized .... "	.18	.18	.20	.22	.25	.35	.50	.60	.75	1.60	2.10	3.70	4.35

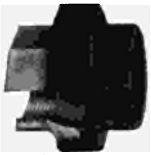


Fig. 458

"KEWANEE" UNIONS

COMBINATION BRASS AND IRON GROUND BALL JOINT

Each union tested with extreme air pressure under water.

Size ....inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Black ....each	$0.18	.19	.22	.27	.40	.48	.66	.80	1.14	2.10	2.65	4.30	5.50
Galvanized .... "	.22	.23	.26	.34	.49	.60	.82	1.10	1.40	2.75	3.50	6.30	7.50

"KEWANEE" FLANGE UNIONS

BRASS AND MALLEABLE IRON SELF-SEATING BALL JOINT

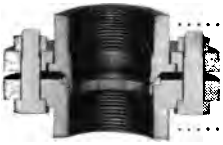


Fig. 459

Size ....inches	1	1¼	1½	2	2½	3	3½	4
Black ....each	$0.80	$1.20	$1.60	$2.00	$3.20	$4.80	$6.00	$ 7.50
Galvanized .... "	1.20	1.80	2.40	3.00	4.80	7.20	9.00	11.25
Size ....inches	4½	5	6	7	8	9	10	
Black ....each	$ 8.75	$10.00	$12.50	$15.00	$18.00	$21.60	$28.80	
Galvanized .... "	13.00	15.00	18.75	22.50	27.00	32.40	43.20	

SECTIONAL VIEW "KEWANEE" FLANGE UNIONS

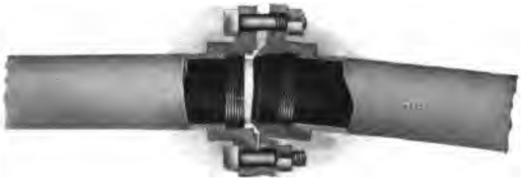


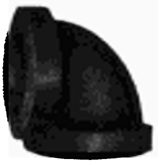
Fig. 460

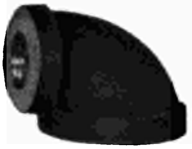
The "Kewanee" Flange Union is the result of careful study and experiment to produce a flange union which can always be made tight and remain so without the use of a gasket.

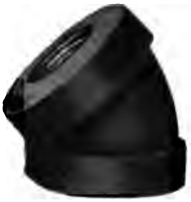
They are made entirely of the highest grade malleable iron, excepting the brass seat, which is made practically integral with the malleable part by the only method which experience has shown to be enduring.

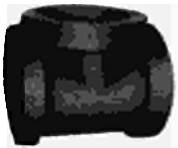
The convex surface of malleable comes in contact with the concave surface of brass; this junction of hard and soft metals insures a more perfect seat than could be obtained otherwise—it makes no difference whether the pipe alignment is straight or not.

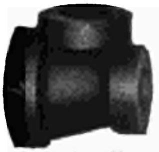
Cast Iron Fittings


Straight Elbow
Fig. 461


Reducing Elbow
Fig. 462


45° Elbow
Fig. 463


Straight Tee
Fig. 464


Reducing Tee
Fig. 465

STANDARD ELBOWS—SCREWED

Size ....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Black, R. H..........each	$0.05	$0.05	$0.06	$0.08	$0.10½	$0.16	$0.20	$0.28	$0.50	$0.75
Galvanized, R. H..... "	.10	.10	.12	.16	.21	.32	.40	.56	1.00	1.50
Black, R. and L...... "	.06	.06	.07	.09	.12	.18	.23	.32	.60	.85
Pitched .... "	....	....	....	.10	.13	.20	.25	.35	.65	1.00
Size ....inches	3½	4	4½	5	6	7	8	9	10	12
Black, R. H..........each	$1.05	$1.20	$1.75	$2.00	$2.75	$4.70	$ 6.75	$ 9.00	$13.50	$20.00
Galvanized, R. H..... "	2.10	2.40	3.50	4.00	5.50	9.40	13.50	18.00	27.00	40.00
Pitched .... "	1.30	1.50	....	....	.....	.....	.....	.....	.....	.....

STANDARD REDUCING ELBOWS—SCREWED

Size ....inches	½	¾	1	1¼	1½	2	2½	3	3½
Black, R. H..........each	$0.07	$0.09	$0.12	$0.18	$0.23	$0.32	$0.60	$0.85	$1.20
Galvanized, R. H..... "	.14	.18	.24	.36	.46	.64	1.20	1.70	2.40
Pitched .... "	.....	.....	.14½	.22	.28	.39	.75	1.10	1.45
Size ....inches	4	4½	5	6	7	8	9	10	12
Black, R. H..........each	$1.40	$2.00	$2.30	$3.15	$ 5.40	$ 7.75	$10.50	$15.50	$23.00
Galvanized, R. H..... "	2.80	4.00	4.60	6.30	10.80	15.50	21.00	31.00	46.00
Pitched .... "	1.70	.....	.....	.....	.....	.....	.....	.....	.....

STANDARD 45° ELBOWS—SCREWED

Size ....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Black, R. H..........each	$0.06	$0.06	$0.07	$0.10	$0.12	$0.19	$0.24	$0.34	$0.60	$0.90
Galvanized, R. H..... "	.12	.12	.14	.20	.24	.38	.48	.68	1.20	1.80
Size ....inches	3½	4	4½	5	6	7	8	9	10	12
Black, R. H..........each	$1.25	$1.45	$2.20	$2.50	$3.45	$ 5.90	$ 8.50	$11.25	$17.00	$25.00
Galvanized, R. H..... "	2.50	2.90	4.40	5.00	6.90	11.80	17.00	22.50	34.00	50.00

STANDARD TEES—SCREWED

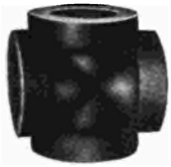
Size ....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Black, R. H..........each	$0.08	$0.08	$0.09	$0.12	$0.15	$0.23	$0.29	$0.41	$0.73	$1.10
Galvanized, R. H..... "	.16	.16	.18	.24	.30	.46	.58	.82	1.46	2.20
Size ....inches	3½	4	4½	5	6	7	8	9	10	12
Black, R. H..........each	$1.50	$1.75	$2.55	$3.00	$4.00	$ 6.80	$ 9.75	$13.00	$19.50	$29.00
Galvanized, R. H..... "	3.00	3.50	5.10	6.00	8.00	13.60	19.50	26.00	39.00	58.00

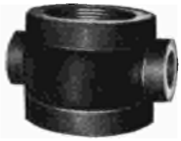
STANDARD REDUCING TEES—SCREWED

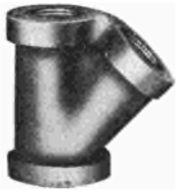
Size ....inches	½	¾	1	1¼	1½	2	2½	3	3½
Black, R. H..........each	$0.10	$0.14	$0.17	$0.27	$0.33	$0.47	$0.83	$1.25	$1.75
Galvanized, R. H..... "	.20	.28	.34	.54	.66	.94	1.66	2.50	3.50
Size ....inches	4	4½	5	6	7	8	9	10	12
Black, R. H..........each	$2.00	$2.95	$3.50	$4.60	$ 7.80	$11.25	$15.00	$22.50	$33.50
Galvanized, R. H..... "	4.00	5.90	7.00	9.20	15.60	22.50	30.00	45.00	67.00

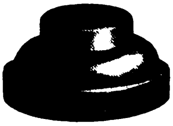
The list price of reducing fittings is determined by the largest opening.
Cast iron fittings always furnished black unless otherwise specified.
Galvanized cast iron fittings not carried in stock.

Cast Iron Fittings


Straight Cross
Fig. 466


Reducing Cross
Fig. 467


Y-Branch
Fig. 468


Reducer
Fig. 469

STANDARD CROSSES—SCREWED

Size .... inches	⅜	½	¾	1	1¼	1½	2	2½	3	3½
Black, R. H................ each	$0.15	.16	.22	.27	.42	.53	.75	1.30	2.00	2.70
Galvanized, R. H............ “	.30	.32	.44	.54	.84	1.06	1.50	2.60	4.00	5.40
Size .... inches	4	4½	5	6	7	8	9	10	12	....
Black, R. H................ each	$3.15	4.60	5.50	7.25	12.25	17.50	23.50	35.00	52.50	....
Galvanized, R. H............ “	6.30	9.20	11.00	14.50	24.50	35.00	47.00	70.00	105.00	....

STANDARD REDUCING CROSSES—SCREWED

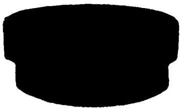
Size .... inches	½	¾	1	1¼	1½	2	2½	3	3½
Black, R. H................ each	$0.18	$0.25	$0.30	$0.46	$0.60	$0.83	$1.45	$2.20	$3.00
Galvanized, R. H............ “	.36	.50	.60	.92	1.20	1.66	2.90	4.40	6.00
Size .... inches	4	4½	5	6	7	8	9	10	12
Black, R. H................ each	$3.50	5.10	6.00	8.00	13.50	19.25	26.00	38.50	58.00
Galvanized, R. H............ “	7.00	10.20	12.00	16.00	27.00	38.50	52.00	77.00	116.00

STANDARD Y-BRANCHES—SCREWED

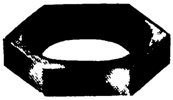
Size .... inches	½	¾	1	1¼	1½	2	2½	3
Black, R. H................ each	$0.20	$0.28	$0.34	$0.54	$0.66	$0.94	$1.66	$2.50
Black, reducing .... “	.23	.33	.40	.62	.76	1.08	1.90	2.90
Galvanized, R. H............ “	.40	.56	.68	1.08	1.32	1.88	3.32	5.00
Size .... inches	3½	4	4½	5	6	7	8	10
Black, R. H................ each	$3.50	$4.00	$ 5.90	$ 7.00	$ 9.20	$15.60	$22.50	$45.00
Black, reducing .... “	4.00	4.60	6.65	8.00	10.60	18.00	26.00	51.75
Galvanized, R. H............ “	7.00	8.00	11.80	14.00	18.40	31.20	45.00	90.00

STANDARD REDUCERS—SCREWED

Size .... inches	2	2½	3	3½	4	4½	5	6	8	10	12
Black, R. H................ each	$0.43	.60	.80	1.00	1.35	1.85	2.00	2.70	6.75	10.00	15.00
Galvanized, R. H............ “	.86	1.20	1.60	2.00	2.70	3.70	4.00	5.40	13.50	20.00	30.00


Cap
Fig. 470

STANDARD CAPS


Locknut
Fig. 471

Size .... inches	2	2½	3	3½	4	4½	5	6	8	10	12
Black, R. H................ each	$0.26	.40	.54	.75	.87	1.05	1.20	1.55	2.85	5.50	7.00
Galvanized, R. H............ “	.52	.80	1.08	1.50	1.74	2.10	2.40	3.10	5.70	11.00	14.00

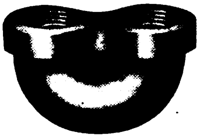
STANDARD LOCKNUTS

Size .... inches	2	2½	3	3½	4	4½	5	6	8	10	12
Black, R. H................ each	$0.25	.27	.34	.47	.64	.85	.90	1.30	2.35	3.00	4.00
Galvanized, R. H............ “	.50	.54	.68	.94	1.28	1.70	1.80	2.60	4.70	6.00	8.00

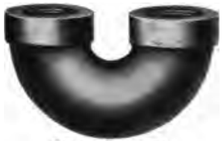
The list price of reducing fittings is determined by the largest opening.
Cast iron fittings always furnished black unless otherwise specified.
Galvanized cast iron fittings not carried in stock.

Cast Iron Fittings

STANDARD RETURN BENDS



Close Pattern
Fig. 472



Open Pattern
Fig. 473

CLOSE PATTERN

Size ....inches	½	¾	1	1¼	1½	2	2½	3	4
Center to center....inches	1¼	1½	1¾	2¼	2½	3¼	3¾	4½	6
Black, R. H....each	$0.18	$0.20	$0.22	$0.28	$0.40	$0.57	$1.20	$1.70	$ 5.00
Galvanized, R. H.... "	.36	.40	.44	.56	.80	1.14	2.40	3.40	10.00
Black, R. and L. or left.... "	.21	.23	.26	.33	.46	.66	1.40	1.95	5.25

OPEN PATTERN

Size ....inches	½	¾	1	1¼	1½	2	2½	3	4
Center to center....inches	1¾	1⅞	2⅜	3	3½	4½	5½	6½	7
Black, R. H....each	$0.25	$0.26	$0.30	$0.40	$0.55	$0.80	$1.35	$2.20	$ 6.50
Galvanized, R. H.... "	.50	.52	.60	.80	1.10	1.60	2.70	4.40	10.00
Black, R. and L. or left.... "	.30	.30	.35	.46	.64	.92	1.55	2.50	7.00

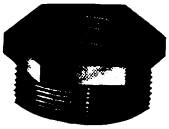
Open pattern return bends are identified by the distance center to center.
Some sizes have a web between the openings and some do not.

WIDE PATTERN

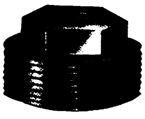
Size ....inches	1	1	1	1	1	1¼	1¼	1¼	1½	1½	1½	2	2	2
Center to center.ins	3	4	5	6	8	4	6	8	4⅞	6	8	4⅞	6	8
Black, R. H....each	$0.45	.50	.60	.75	1.00	1.00	1.25	2.75	1.30	1.60	2.00	1.75	2.00	3.50
Galvanized, R.H. "	.80	.90	1.10	1.30	1.60	1.75	2.00	3.75	2.30	2.60	3.25	3.00	3.25	5.00

Galvanized cast iron fittings not carried in stock.

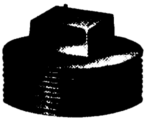
STANDARD BUSHINGS AND PLUGS



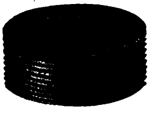
Bushing
Fig. 474



Bushing
Fig. 475



Plug
Fig. 476



Countersunk Plug
Fig. 477

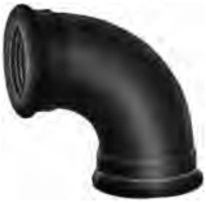
Bushings reducing one size only, up to and including 2½ inches, are malleable, and will be found listed among malleable fittings.

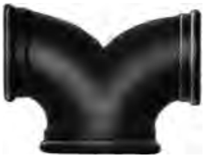
Cast iron bushings 2½ inches and smaller, reduce two or more sizes; 3-inch and larger reduce one or more sizes.

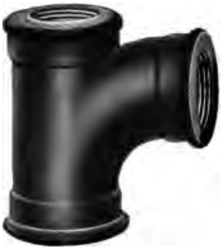
The list price of bushings is determined by the male thread size.

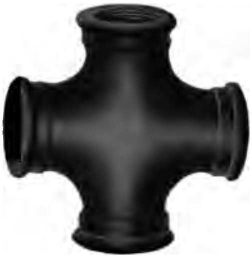
Size ....inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Bushings, black....each	.....	....	....	$.04	.05	.06	.07	.09	.14	.21	.30
Bushings, galvanized.... "	.....	....	....	.08	.10	.12	.14	.18	.28	.42	.60
Plugs, black .... "	$0.02	.02	.02	.02	.03	.04	.05	.07	.10	.18	.25
Plugs, galvanized.... "	.04	.04	.04	.04	.06	.08	.10	.14	.20	.36	.50
Plugs, countersunk.... "	.....	....	....	.04	.06	.08	.09	.11	.15	.30	.40
Size ....inches	3½	4	4½	5	6	7	8	9	10	12	....
Bushings, black....each	$0.40	.50	.75	.93	1.25	1.87	2.75	3.25	3.75	5.00	....
Bushings, galvanized.... "	.80	1.00	1.50	1.85	2.50	3.75	5.50	6.50	7.50	10.00	....
Plugs, black .... "	.38	.42	.65	.88	1.20	1.85	2.75	3.25	3.75	5.00	....
Plugs, galvanized.... "	.76	.84	1.30	1.75	2.40	3.70	5.50	6.50	7.50	10.00	....

Cast Iron Fittings


Long Sweep Elbow
Fig. 478


Long Sweep Double Branch Elbow
Fig. 479


Long Sweep Tee
Fig. 480


Long Sweep Cross
Fig. 481

STANDARD LONG SWEEP ELBOWS—SCREWED

Size ....inches	¾	1	1¼	1½	2	2½	3	3½	4
Black, straight...........each	$ 0.26	$ 0.32	$ 0.40	$ 0.55	$ 0.80	$ 1.20	$ 2.25	$ 3.25	$ 3.50
Black, reducing.......... "	.40	.48	.60	.83	1.20	1.80	3.38	4.88	5.25
Galvanized, straight...... "	.52	.64	.80	1.10	1.60	2.40	4.50	6.50	7.00
Galvanized, reducing..... "	.80	.96	1.20	1.66	2.40	3.60	6.76	9.76	10.50

Size ....inches	4½	5	6	7	8	9	10	12	......
Black, straight...........each	$ 5.50	$ 6.50	$ 8.75	$13.00	$17.00	$25.50	$30.00	$40.00	......
Black, reducing.......... "	8.25	9.75	13.13	19.50	25.50	38.25	45.00	60.00	......
Galvanized, straight...... "	11.00	13.00	17.50	26.00	34.00	51.00	60.00	80.00	......
Galvanized, reducing..... "	16.50	19.50	26.26	39.00	51.00	76.50	90.00	120.00	......

STANDARD LONG SWEEP DOUBLE BRANCH ELBOWS—SCREWED

Size ....inches	¾	1	1¼	1½	2	2½	3	3½	4
Black, straight...........each	$ 0.51	$ 0.64	$ 0.80	$ 1.10	$ 1.60	$ 2.40	$ 4.50	$ 6.50	$ 7.00
Black, reducing.......... "	.77	.96	1.20	1.65	2.40	3.60	6.75	9.75	10.50
Galvanized, straight...... "	1.02	1.28	1.60	2.20	3.20	4.80	9.00	13.00	14.00
Galvanized, reducing..... "	1.54	1.92	2.40	3.30	4.80	7.20	13.50	19.50	21.00

Size ....inches	4½	5	6	7	8	9	10	12	......
Black, straight...........each	$11.00	$13.00	$17.50	$26.00	$34.00	$51.00	$60.00	$80.00	......
Black, reducing.......... "	16.50	19.50	26.25	39.00	51.00	76.50	90.00	120.00	......
Galvanized, straight...... "	22.00	26.00	35.00	52.00	68.00	102.00	120.00	160.00	......
Galvanized, reducing..... "	33.00	39.00	52.50	78.00	102.00	153.00	180.00	240.00	......

In specifying double branch elbows the inlet (or the bottom opening as shown in above cut) is mentioned first, and then the branch outlets.

STANDARD LONG SWEEP TEES—SCREWED

Size ....inches	¾	1	1¼	1½	2	2½	3	3½	4
Black, straight...........each	$ 0.40	$ 0.48	$ 0.60	$ 0.82	$ 1.20	$ 1.80	$ 3.40	$ 4.90	$ 5.25
Black, reducing.......... "	.58	.72	.90	1.23	1.80	2.70	5.10	7.35	7.88
Galvanized, straight...... "	.80	.96	1.20	1.64	2.40	3.60	6.80	9.80	10.50
Galvanized, reducing..... "	1.16	1.44	1.80	2.46	3.60	5.40	10.20	14.70	15.76

Size ....inches	4½	5	6	7	8	9	10	12	......
Black, straight...........each	$ 8.25	$ 9.75	$13.25	$19.50	$25.50	$38.00	$45.00	$60.00	......
Black, reducing.......... "	12.38	14.63	19.88	29.25	38.25	57.00	67.50	90.00	......
Galvanized, straight...... "	16.50	19.50	26.50	39.00	51.00	76.00	90.00	120.00	......
Galvanized, reducing..... "	24.76	29.26	39.76	58.50	76.50	114.00	135.00	180.00	......

STANDARD LONG SWEEP CROSSES—SCREWED

Size ....inches	¾	1	1¼	1½	2	2½	3	3½	4
Black, straight...........each	$ 0.68	$ 0.85	$ 1.10	$ 1.50	$ 2.15	$ 3.20	$ 6.00	$ 8.75	$ 9.50
Galvanized, straight...... "	1.36	1.70	2.20	3.00	4.30	6.40	12.00	17.50	19.00

Size ....inches	4½	5	6	7	8	9	10	12	......
Black, straight...........each	$15.00	$17.50	$24.00	$35.00	$45.00	$68.00	$80.00	107.00	......
Galvanized, straight...... "	30.00	35.00	48.00	70.00	90.00	136.00	160.00	214.00	......

Cast Iron Fittings

STANDARD FLANGE UNIONS

FACED—NO GASKET

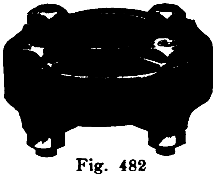


Fig. 482

Size ....inches	½	¾	1	1¼	1½	2	2½	3	3½
Number of bolts................	3	3	4	4	4	4	4	4	4
Black ....each	$0.40	$0.46	$0.52	$0.64	$0.78	$1.00	$1.25	$1.50	$1.80
Galvanized .... "	$0.80	$0.92	$1.04	$1.28	$1.56	$2.00	$2.50	$3.00	$3.60
Size ....inches	4	4½	5	6	7	8	9	10	12
Number of bolts................	5	5	5	6	7	8	8	10	10
Black ....each	$2.10	$2.70	$3.15	$3.95	$ 5.50	$ 7.00	$10.00	$11.50	$16.00
Galvanized .... "	$4.20	$5.40	$6.30	$7.90	$11.00	$14.00	$20.00	$23.00	$32.00

EXTRA HEAVY FLANGE UNIONS

FACED—NO GASKET

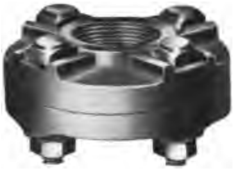


Fig. 483

Size ....inches	½	¾	1	1¼	1½	2	2½	3	3½
Number of bolts.........	3	4	4	4	4	5	5	6	6
Black ....each	$0.60	$0.70	$0.80	$1.00	$1.15	$1.50	$1.90	$2.25	$2.70
Size ....inches	4	4½	5	6	7	8	10		12
Number of bolts.........	7	8	8	9	10	10	12		14
Black ....each	$3.15	$4.00	$4.75	$6.00	$8.25	$10.50	$17.25		24.00

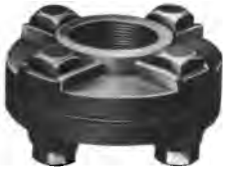


Fig. 484

OIL COUNTRY FLANGE UNIONS

HEAVY PATTERN

FOR WORKING PRESSURES UP TO 200 POUNDS

Size ....inches	2	3
Diameter of flange.............inches	5 9/16	7⅛
Number of bolts.....................	4	4
Black ....each	$1.50	$2.25

Oil Country Flange Unions are always furnished with gasket.

FLANGES

FACED AND DRILLED
FOR RIVETED PIPE

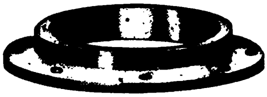


Fig. 485

Size ....inches	2	3	4	5	6	7	8
Outside diameter of flange....	6	7½	9	10	11	12½	13½
Black ....each	$1.50	$2.25	$3.00	$3.65	$4.00	$5.75	$6.50
Size ....inches	10	12	14	15	16	18	20
Outside diameter of flange....	16	19	21	21	23½	25	27½
Black ....each	$9.25	$12.50	$16.00	$21.00	$26.00	$31.00	$34.00

Cast Iron Fittings

COMMON FLANGES

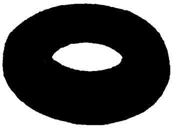


Fig. 486

Diameter of Flange, Inches	SIZE OF PIPE IN INCHES																		
	3/8	1/2	3/4	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8	9	10	12
3	$0.10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
3½	....	.15	.15	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
4	....	....	.22	.16	.16	....	....	....	....	....	....	....	....	....	....	....	....	....	....
4½	....	....	....	....	.25	.22	....	....	....	....	....	....	....	....	....	....	....	....	....
5	....	....	.30	.30	.30	.30	....	....	....	....	....	....	....	....	....	....	....	....	....
5½	....	....	....	....	....	....	.35	....	....	....	....	....	....	....	....	....	....	....	....
6	....	....	....	.42	.40	.40	.42	.42	....	....	....	....	....	....	....	....	....	....	....
6½	....	....	....	....	....	....	.50	.50	.50	....	....	....	....	....	....	....	....	....	....
7	....	....	....	....	....	....	.62	.62	.62	....	....	....	....	....	....	....	....	....	....
7½	....	....	....	....	....	....	....	....	.75	....	....	....	....	....	....	....	....	....	....
8	....	....	....	....	....	....	.90	.90	.90	.90	.90	....	....	....	....	....	....	....	....
8½	....	....	....	....	....	....	....	....	....	1.00	1.00	....	....	....	....	....	....	....	....
9	....	....	....	....	....	....	....	....	1.15	1.15	1.15	1.15	....	....	....	....	....	....	....
9½	....	....	....	....	....	....	....	....	....	....	....	1.25	....	....	....	....	....	....	....
10	....	....	....	....	....	....	....	....	....	1.50	1.50	1.50	1.50	1.50	....	....	....	....	....
11	....	....	....	....	....	....	....	....	....	....	....	1.75	1.75	1.75	....	....	....	....	....
12	....	....	....	....	....	....	....	....	....	....	....	....	2.20	2.20	2.20	....	....	....	....
12½	....	....	....	....	....	....	....	....	....	....	....	....	2.20	2.20	2.20	....	....	....	....
13	....	....	....	....	....	....	....	....	....	....	....	....	....	2.80	2.80	2.80	....	....	....
13½	....	....	....	....	....	....	....	....	....	....	....	....	....	2.80	2.80	2.80	....	....	....
14	....	....	....	....	....	....	....	....	....	....	....	....	....	3.25	3.25	3.25	....	....	....
15	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4.00	4.00	4.00	....	....
16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	5.00	5.00	5.00	....
17	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	5.75	5.75	....
18	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7.00	7.00
19	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7.50	7.50
20	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	8.50

Above flanges furnished neither faced nor drilled unless so specified.

Flanges of any required thickness to order.

For companion flanges, see page 229.

DRILLED FLOOR FLANGES

Fig. 487

Size of pipe........inches O. D. of flange.....inches	3/8 3	3/8 3½	1/2 2½	1/2 3	1/2 3½	1/2 4	3/4 3	3/4 3½	3/4 4	1 3½	1 4
Black ....each	$0.14	$0.17	$0.15	$0.15	$0.17	$0.20	$0.18	$0.18	$0.21	$0.20	$0.22
Size of pipe........inches O. D. of flange.....inches	1 5	1¼ 4	1¼ 4½	1¼ 5	1½ 4½	2 5	2 5½	2 6	2½ 6	3 7	....
Black ....each	$0.33	$0.25	$0.30	$0.35	$0.31	$0.45	$0.45	$0.55	$0.55	$0.70	.....

Cast Iron Fittings

EXTRA HEAVY

FOR WORKING PRESSURES UP TO 250 POUNDS
TESTED TO 800 POUNDS HYDRAULIC PRESSURE

EXTRA HEAVY ELBOWS—SCREWED

Size ....inches	½	¾	1	1¼	1½	2	2½	3	3½
Black, R. H....each	$0.25	$0.30	$0.35	$0.45	$0.60	$0.75	$1.25	$2.00	$2.75
Size ....inches	4	4½	5	6	7	8	9	10	12
Black, R. H....each	$3.50	$4.25	$5.50	$8.00	$12.00	$17.00	$25.00	$28.00	$40.00

EXTRA HEAVY REDUCING ELBOWS—SCREWED

Size ....inches	½	¾	1	1¼	1½	2	2½	3	3½
Black, R. H....each	....	$0.40	$0.45	$0.55	$0.75	$0.95	$1.55	$2.50	$3.40
Size ....inches	4	4½	5	6	7	8	9	10	12
Black, R. H....each	$4.40	$5.30	$6.80	$10.00	$15.00	$21.00	$31.00	$35.00	$50.00

EXTRA HEAVY 45° ELBOWS—SCREWED

Size ....inches	½	¾	1	1¼	1½	2	2½	3	3½
Black, R. H....each	$0.35	$0.40	$0.44	$0.55	$0.70	$0.90	$1.50	$2.50	$3.50
Size ....inches	4	4½	5	6	7	8	9	10	12
Black, R. H....each	$4.50	$5.50	$6.75	$9.75	$14.50	$21.00	$31.00	$34.00	$48.00

EXTRA HEAVY TEES—SCREWED

Size ....inches	½	¾	1	1¼	1½	2	2½	3	3½
Black, R. H....each	$0.40	$0.45	$0.55	$0.70	$0.90	$1.15	$1.80	$3.00	$4.25
Size ....inches	4	4½	5	6	7	8	9	10	12
Black, R. H....each	$5.50	$6.75	$8.25	$12.00	$18.00	$25.00	$35.00	$42.00	$60.00

EXTRA HEAVY REDUCING TEES—SCREWED

Size ....inches	½	¾	1	1¼	1½	2	2½	3	3½
Black, R. H....each	....	$0.60	$0.70	$0.90	$1.15	$1.40	$2.25	$3.75	$5.30
Size ....inches	4	4½	5	6	7	8	9	10	12
Black, R. H....each	$6.85	$8.50	$10.25	$15.00	$22.50	$31.00	$44.00	$52.00	$75.00

EXTRA HEAVY CROSSES—SCREWED

Size ....inches	½	¾	1	1¼	1½	2	2½	3	3½
Black, R. H....each	$0.60	$0.65	$0.70	$0.90	$1.20	$1.50	$2.50	$4.00	$5.50
Size ....inches	4	4½	5	6	7	8	9	10	12
Black, R. H....each	$7.00	$8.50	$11.00	$16.00	$24.00	$34.00	$48.00	$56.00	$80.00

EXTRA HEAVY REDUCING CROSSES—SCREWED

Size ....inches	½	¾	1	1¼	1½	2	2½	3	3½
lack, R. H....each	$0.75	$0.85	$0.90	$1.15	$1.50	$1.85	$3.15	$5.00	$6.85
Size ....inches	4	4½	5	6	7	8	9	10	12
Black, R. H....each	$8.75	$10.00	$13.75	$20.00	$30.00	$42.00	$60.00	$70.00	$100.00

Galvanized extra heavy fittings double above lists.

Cast Iron Fittings

EXTRA HEAVY

FOR WORKING PRESSURES UP TO 500 POUNDS

TESTED TO 1500 POUNDS HYDRAULIC PRESSURE

Size ....inches	2	2½	3	4	4½	5	6	7	8	10	12
Elbows ....each	$2.00	3.00	4.50	6.50	9.00	12.00	14.00	24.00	28.00	34.00	60.00
Elbows, reducing..... "	2.50	3.75	5.50	8.00	11.25	15.00	17.50	30.00	35.00	42.50	75.00
Elbows, 45°......... "	2.50	3.75	5.50	8.00	11.25	15.00	17.50	30.00	35.00	42.50	75.00
Tees .... "	3.00	4.25	5.25	7.50	10.00	14.00	18.00	28.00	32.00	48.00	85.00
Tees, reducing....... "	3.75	5.25	6.50	9.50	12.50	17.50	22.50	35.00	40.00	60.00	100.00
Crosses .... "	3.75	5.25	6.50	10.00	12.50	17.50	22.00	36.00	40.00	60.00	100.00
Crosses, reducing.... "	4.75	6.50	8.00	12.50	15.50	22.00	27.50	45.00	50.00	80.00	125.00
Y-branches .... "	3.50	5.00	9.00	15.00	20.00	30.00	40.00	60.00	70.00	95.00	130.00
Bushings .... "	1.75	2.25	2.50	2.75	3.00	3.90	4.50	8.25	9.75	13.50	24.00
Reducers .... "	2.75	3.25	3.75	4.50	5.25	6.00	8.50	15.00	18.00	24.00	32.00
Caps .... "	2.00	2.35	2.70	3.00	3.30	3.60	5.00	6.50	9.00	12.75	20.00
Plugs .... "	1.75	2.25	2.50	2.75	3.00	3.90	4.50	8.25	9.75	13.50	20.00
Flange unions....... "	4.00	5.00	7.00	8.00	9.00	10.50	13.50	16.50	18.50	26.00	45.00

Fittings with one or more openings with different thread, add 25 per cent. to list.

Reducing Y-branches, add 25 per cent. to list.

EXTRA HEAVY

FOR WORKING PRESSURES UP TO 1000 POUNDS

TESTED TO 2500 POUNDS HYDRAULIC PRESSURE

Size ....inches	2	2½	3	4	4½	5	6	7	8	10	12
Elbows ....each	$2.00	3.00	4.50	6.50	9.00	12.00	14.00	24.00	28.00	34.00	60.00
Elbows, reducing..... "	2.50	3.75	5.50	8.00	11.25	15.00	17.50	30.00	35.00	42.50	75.00
Elbows, 45°......... "	2.50	3.75	5.50	8.00	11.25	15.00	17.50	30.00	35.00	42.50	75.00
Tees .... "	3.00	4.25	5.25	7.50	10.00	14.00	18.00	28.00	32.00	48.00	85.00
Tees, reducing....... "	3.75	5.25	6.50	9.50	12.50	17.50	22.50	35.00	40.00	60.00	100.00
Crosses .... "	3.75	5.25	6.50	10.00	12.50	17.50	22.00	36.00	40.00	60.00	100.00
Crosses, reducing.... "	4.75	6.50	8.00	12.50	15.50	22.00	27.50	45.00	50.00	80.00	125.00
Y-branches .... "	3.50	5.00	9.00	15.00	20.00	30.00	40.00	60.00	70.00	95.00	130.00
Bushings .... "	1.75	2.25	2.50	2.75	3.00	3.90	4.50	8.25	9.75	13.50	24.00
Reducers .... "	2.75	3.25	3.75	4.50	5.25	6.00	8.50	15.00	18.00	24.00	32.00
Caps .... "	2.00	2.35	2.70	3.00	3.30	3.60	5.00	6.50	9.00	12.75	20.00
Plugs .... "	1.75	2.25	2.50	2.75	3.00	3.90	4.50	8.25	9.75	13.50	20.00
Flange unions....... "	4.00	5.00	7.00	8.00	9.00	10.50	13.50	16.50	18.50	26.00	45.00

Fittings with one or more openings with different thread, add 25 per cent. to list.

Reducing Y-branches, add 25 per cent. to list.

Cast Iron Fittings

CASING FITTINGS

FOR WORKING PRESSURES UP TO 125 POUNDS

Size ....inches	2¾	3	3¼	3½	3¾	4	4¼	4½	4¾	5
Elbows ....each	$ 1.10	1.10	1.35	1.80	1.80	2.50	2.50	3.00	3.00	3.50
Elbows, reducing.......... "	1.40	1.40	1.75	2.25	2.25	3.00	3.00	3.75	3.75	4.35
Elbows, long radius........ "	2.50	2.50	3.50	4.50	4.50	5.50	5.50	7.00	8.00	9.00
Elbows, 45° .... "	1.60	1.60	2.00	2.70	2.70	3.75	3.75	4.00	4.00	4.50
Tees .... "	1.50	1.50	2.00	2.50	2.50	3.50	3.50	4.00	4.25	5.00
Tees, reducing .... "	1.85	1.85	2.50	3.00	3.00	4.35	4.35	5.00	5.25	6.25
Tees, long radius.......... "	3.00	3.00	5.00	6.60	6.60	8.00	8.00	10.00	12.00	14.00
Crosses .... "	2.20	2.20	2.70	3.50	3.50	5.00	5.00	5.70	6.00	7.00
Crosses, reducing .... "	2.75	2.75	3.30	4.35	4.35	6.25	6.25	7.00	7.50	8.75
Y-Branches .... "	3.25	3.25	4.50	6.00	6.00	8.00	8.00	9.00	9.00	10.00
Bushings .... "	.60	.60	.80	1.00	1.00	1.50	1.50	1.85	1.85	2.00
Reducer bushings.......... "	1.20	1.20	1.50	2.00	2.00	2.75	2.75	3.00	3.00	3.50
Reducers .... "	1.20	1.20	1.50	2.00	2.00	2.75	2.75	3.00	3.00	3.50
Caps .... "	.80	.80	1.10	1.30	1.30	1.60	1.60	2.00	2.00	2.15
Plugs .... "	.50	.50	.75	.85	.85	1.35	1.35	1.75	1.75	2.00
Locknuts .... "	.50	.50	.70	.95	.95	1.25	1.25	1.35	1.35	1.50
Flange unions .... "	2.25	2.25	2.75	3.15	3.15	4.50	4.50	5.00	5.00	5.50
Return bends, close........ "	3.00	3.00	4.00	5.00	5.00	6.00	6.50	.....	.....	......
Return bends, open........ "	3.75	3.75	4.50	5.75	5.75	8.00	8.00	.....	.....	......

Size ....inches	$5\frac{3}{16}$ 5⅝	6¼ 6⅝	7⅝	8¼	8⅝	9⅝	10 10⅝	11⅝	12½	13½
Elbows ....each	$ 4.00	7.00	10.00	13.00	13.00	20.00	28.00	35.00	45.00	58.00
Elbows, reducing .... "	5.00	8.75	12.50	16.00	16.00	25.00	35.00	45.00	60.00	......
Elbows, long radius....... "	10.00	15.00	20.00	28.00	28.00	35.00	.....	.....	......	......
Elbows, 45° .... "	5.50	9.00	13.00	16.00	16.00	25.00	35.00	45.00	60.00	75.00
Tees .... "	5.50	10.00	15.00	20.00	20.00	25.00	32.00	40.00	50.00	65.00
Tees, reducing .... "	6.75	12.50	18.75	25.00	25.00	30.00	35.00	50.00	70.00	82.00
Tees, long radius.......... "	16.50	24.00	30.00	48.00	48.00	65.00	.....	.....	......	......
Crosses .... "	7.80	14.00	20.00	26.00	26.00	40.00	55.00	70.00	90.00	112.50
Crosses, reducing.... .... "	9.70	17.50	25.00	32.00	32.00	50.00	70.00	90.00	115.00	......
Y-Branches .... "	12.00	17.00	25.00	30.00	30.00	40.00	50.00	65.00	85.00	110.00
Bushings .... "	2.50	3.75	5.50	6.50	6.50	7.50	9.00	14.00	20.00	26.00
Reducers .... "	4.00	8.00	10.00	12.00	12.00	15.00	22.00	30.00	40.00	50.00
Caps .... "	2.35	4.00	5.00	6.00	6.00	7.25	8.50	16.00	25.00	36.00
Plugs .... "	2.40	3.75	5.50	6.50	6.50	7.50	9.00	11.00	14.00	18.00
Locknuts .... "	1.90	2.50	3.50	4.00	4.00	4.50	5.25	12.50	20.00	26.00
Flange unions .... "	6.50	8.00	12.00	15.00	15.00	20.00	28.00	35.00	45.00	60.00

Casing fittings with one or more openings for pipe, add 25 per cent. to list.
Reducing Y-branches, add 25 per cent. to list.
Galvanized casing fittings can be furnished at double the above lists.
NOTE.—Sizes shown indicate nominal inside diameter of casing and will be so furnished unless otherwise specified.

EXTRA HEAVY CASING FITTINGS

LIST APPLYING TO FITTINGS

For Working Pressures up to 250 Pounds—Tested to 800 Pounds Hydraulic Pressure.
For Working Pressures up to 500 Pounds—Tested to 1500 Pounds Hydraulic Pressure.
For Working Pressures up to 1000 Pounds—Tested to 2500 Pounds Hydraulic Pressure.

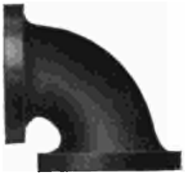
Size ....inches	4½	5⅝	6¼	6⅝	7⅝	8¼	9⅝	10	11⅝	12½
Elbows ....each	$ 6.50	12.00	14.00	20.00	24.00	28.00	30.00	34.00	48.00	60.00
Elbows, reducing .... "	8.00	15.00	17.50	25.00	30.00	35.00	37.50	42.50	60.00	75.00
Elbows, 45° .... "	8.00	15.00	17.50	25.00	30.00	35.00	37.50	42.50	60.00	75.00
Tees .... "	7.50	14.00	18.00	24.00	28.00	32.00	38.00	48.00	75.00	85.00
Tees, reducing .... "	9.50	17.50	22.50	32.00	35.00	40.00	48.00	60.00	85.00	100.00
Crosses .... "	10.00	17.50	22.00	32.00	36.00	40.00	48.00	60.00	85.00	100.00
Crosses, reducing .... "	12.50	22.00	27.50	40.00	45.00	50.00	60.00	80.00	105.00	125.00
Y-branches .... "	15.00	30.00	40.00	52.00	60.00	70.00	80.00	95.00	115.00	130.00
Bushings .... "	2.75	3.90	4.50	5.60	8.25	9.75	11.25	13.50	16.00	24.00
Reducers .... "	4.50	6.00	8.50	12.00	15.00	18.00	22.50	24.00	28.00	32.00
Caps .... "	3.00	3.60	5.00	6.00	6.50	9.00	10.50	12.75	14.00	20.00
Plugs .... "	2.75	3.90	4.50	5.60	8.25	9.75	11.25	13.50	16.00	20.00
Flange unions .... "	8.00	10.50	13.50	15.00	16.50	18.50	20.00	26.00	35.00	45.00

Casing fittings with one or more openings with different thread, add 25 per cent. to list.
Reducing Y-branches, add 25 per cent. to list.
Galvanized casing fittings can be furnished at double the above lists.
When ordering state working pressure of fittings wanted.
NOTE.—Sizes shown indicate nominal inside diameter of casing and will be so furnished unless otherwise specified.

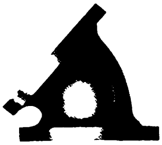
Cast Iron Fittings

STANDARD ELBOWS—FLANGED

FOR WORKING PRESSURES UP TO 125 POUNDS



90° Elbow
Fig. 488



45° Elbow
Fig. 489

Size, Inches	Diameter of Flanges, Inches	Center to Face 90° Elbows, Inches	Center to Face 45° Elbows, Inches	Price			
				90° Elbows		45° Elbows	
				With Flanges Faced, Each	With Flanges Faced and Drilled, Each	With Flanges Faced, Each	With Flanges Faced and Drilled, Each
1¼	4½	3¾	2	$ 4.75	$ 5.75	$ 5.25	$ 6.25
1½	5	4	2¼	4.75	5.75	5.25	6.25
2	6	4½	2½	4.75	5.75	5.25	6.25
2½	7	5	3	5.00	6.25	5.50	6.75
3	7½	5½	3	5.75	7.00	6.25	7.50
3½	8½	6	3½	6.50	7.75	7.25	8.50
4	9	6½	4	7.25	9.25	8.00	10.00
4½	9¼	7	4	9.00	11.00	10.00	12.00
5	10	7½	4½	9.75	11.75	10.75	12.75
6	11	8	5	12.00	14.00	13.00	15.00
7	12½	8½	5½	16.00	19.75	16.00	19.75
8	13½	9	5½	20.00	23.75	20.00	23.75
9	15	10	6	26.00	30.00	26.00	30.00
10	16	11	6½	32.00	36.00	32.00	36.00
12	19	12	7½	44.00	50.00	44.00	50.00
14	21	14	7½	58.00	65.00	58.00	65.00
15	22¼	14½	8	72.00	80.00	72.00	80.00
16	23½	15	8	84.00	93.00	84.00	93.00
18	25	16½	8½	108.00	118.00	108.00	118.00
20	27½	18	9½	135.00	148.00	135.00	148.00
22	29½	20	10	160.00	180.00	160.00	180.00
24	32	22	11	200.00	220.00	200.00	220.00

Flanged fittings will always be furnished faced only, unless otherwise ordered.

Templates for drilling, see page 229.

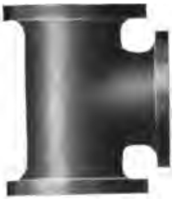
STANDARD TEES—FLANGED

FOR WORKING PRESSURES UP TO 125 POUNDS

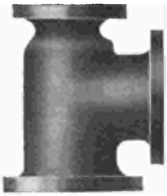
Size, Inches	Diameter of Flanges, Inches	Center to Face, Inches	Face to Face, Inches	Price			
				Straight Tees		Reducing Tees	
				With Flanges Faced, Each	With Flanges Faced and Drilled, Each	With Flanges Faced, Each	With Flanges Faced and Drilled, Each
1¼	4½	3¾	7½	$ 7.00	$ 8.50	......	......
1½	5	4	8	7.00	8.50	$ 8.00	$ 9.50
2	6	4½	9	7.00	8.50	8.00	9.50
2½	7	5	10	7.25	9.00	8.25	10.00
3	7½	5½	11	8.25	10.00	9.50	11.25
3½	8½	6	12	9.50	11.25	11.00	12.75
4	9	6½	13	10.50	13.50	12.00	15.00
4½	9¼	7	14	13.00	16.00	15.00	18.00
5	10	7½	15	14.25	17.25	16.25	19.25
6	11	8	16	17.50	20.50	20.00	23.00
7	12½	8½	17	23.00	28.75	26.50	32.00
8	13½	9	18	29.00	34.75	33.50	39.00
9	15	10	20	38.00	44.00	43.50	50.00
10	16	11	22	46.50	52.50	53.50	60.00
12	19	12	24	64.00	73.00	74.00	83.00
14	21	14	28	84.00	95.00	96.00	107.00
15	22¼	14½	29	105.00	117.00	120.00	132.00
16	23½	15	30	122.00	135.00	140.00	153.00
18	25	16½	33	155.00	170.00	178.00	193.00
20	27½	18	36	195.00	215.00	225.00	245.00
22	29½	20	40	230.00	260.00	265.00	295.00
24	32	22	44	290.00	320.00	335.00	365.00

Flanged fittings will always be furnished faced only, unless otherwise ordered.

Templates for drilling, see page 229.



Straight Tee
Fig. 490

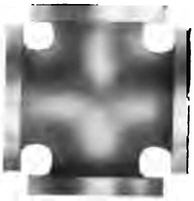


Reducing Tee
Fig. 491

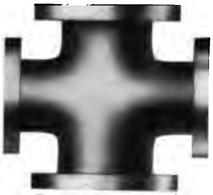
Cast Iron Fittings

STANDARD CROSSES—FLANGED

FOR WORKING PRESSURES UP TO 125 POUNDS



Straight Cross
Fig. 492

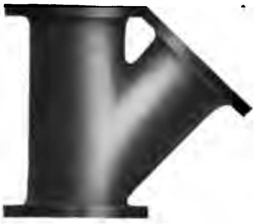


Reducing Cross
Fig. 493

Size, Inches	Diameter of Flanges, Inches	Center to Face, Inches	Face to Face, Inches	Price			
				Straight Crosses		Reducing Crosses	
				With Flanges Faced, Each	With Flanges Faced and Drilled, Each	With Flanges Faced, Each	With Flanges Faced and Drilled, Each
1¼	4½	3¾	7½	$ 9.50	$11.50	.....	.....
1½	5	4	8	9.50	11.50	.....	.....
2	6	4½	9	9.50	11.50	$11.00	$13.00
2½	7	5	10	10.00	12.50	11.50	14.00
3	7½	5½	11	11.50	14.00	13.25	15.75
3½	8½	6	12	13.00	15.50	15.00	17.50
4	9	6½	13	14.50	18.50	16.75	20.75
4½	9¼	7	14	18.00	22.00	20.75	25.00
5	10	7½	15	19.50	23.50	22.50	26.50
6	11	8	16	24.00	28.00	27.50	31.50
7	12½	8½	17	32.00	39.50	37.00	45.00
8	13½	9	18	40.00	47.50	46.00	53.50
9	15	10	20	52.00	60.00	60.00	68.00
10	16	11	22	64.00	72.00	74.00	82.00
12	19	12	24	88.00	100.00	100.00	112.00
14	21	14	28	116.00	130.00	132.00	146.00
15	22¼	14½	29	144.00	160.00	165.00	180.00
16	23½	15	30	168.00	186.00	193.00	210.00
18	25	16½	33	216.00	236.00	248.00	268.00
20	27½	18	36	270.00	296.00	310.00	335.00
22	29½	20	40	320.00	360.00	370.00	410.00
24	32	22	44	400.00	440.00	460.00	500.00

Flanged fittings will always be furnished faced only, unless otherwise ordered.

Templates for drilling, see page 229.



Lateral
Fig. 494

STANDARD LATERALS—FLANGED

FOR WORKING PRESSURES UP TO 125 POUNDS

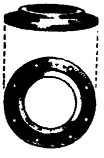
Size, Inches	Diameter of Flanges, Inches	Center to Face of Run or Outlet, Inches	Face to Face of Run, Inches	Price			
				Straight Laterals		Reducing Laterals	
				With Flanges Faced, Each	With Flanges Faced and Drilled, Each	With Flanges Faced, Each	With Flanges Faced and Drilled, Each
2	6	8	10½	$9.50	$11.50	.....	.....
2½	7	9½	12	10.00	12.50	.....	.....
3	7½	10	13	11.50	14.00	.....	.....
3½	8½	11½	14½	13.00	15.50	.....	.....
4	9	12	15	14.50	18.50	$16.75	$20.75
4½	9¼	12½	15½	18.00	22.00	20.75	25.00
5	10	13½	17	19.50	23.50	22.50	26.50
6	11	14½	18	24.00	28.00	27.50	31.50
7	12½	16½	20½	32.00	39.50	37.00	45.00
8	13½	17½	22	40.00	47.50	46.00	53.50
9	15	19½	24	52.00	60.00	60.00	68.00
10	16	20½	25½	64.00	72.00	74.00	82.00
12	19	24½	30	88.00	100.00	100.00	112.00
14	21	27	33	116.00	130.00	132.00	146.00
15	22¼	28½	34½	144.00	160.00	165.00	180.00
16	23½	30	36½	168.00	186.00	193.00	210.00
18	25	32	39	216.00	236.00	248.00	268.00

Flanged fittings will always be furnished faced only, unless otherwise ordered.
Templates for drilling, see page 229.
Reducing laterals made to order only.

Cast Iron Fittings

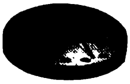
STANDARD COMPANION FLANGES

FOR STANDARD FLANGED VALVES AND FITTINGS FOR WORKING PRESSURES UP TO 125 POUNDS TEMPLATE FOR DRILLING FLANGED FITTINGS AND PRICES OF FLANGES



Threaded Flange
Fig. 495

Blind Flange—Plain
In sizes 16-inch O. D. and smaller
Fig. 496



Blind Flange—Ribbed
In sizes 19-inch O. D. and larger
Fig. 497

Size Pipe, Inches	Outside Diameter of Flange, Inches	Diameter of Bolt Circle, Inches	Threaded Flanges		Blind Flanges		Thickness of Flanges, Inches	Number of Bolts to Flange	Size of Bolts, Inches	Price of Bolts Per Set for One Joint
			Faced, Each	Faced and Drilled, Each	Faced, Each	Faced and Drilled, Each				
1	4	3	$1.00	$1.25	.....	.....	7/16	4	7/16 x 1½	$ .25
1¼	4½	3⅜	1.05	1.35	.....	.....	½	4	7/16 x 1½	.25
1½	5	3⅞	1.10	1.40	.....	.....	9/16	4	½ x 1¾	.25
2	6	4¾	1.20	1.50	$1.40	$1.70	⅝	4	⅝ x 2	.25
2½	7	5½	1.40	2.00	1.60	2.20	11/16	4	⅝ x 2¼	.25
3	7½	6	1.60	2.25	1.85	2.50	¾	4	⅝ x 2½	.25
3½	8½	7	1.80	2.50	2.10	2.80	13/16	4	⅝ x 2½	.25
4	9	7½	2.15	3.00	2.50	3.35	15/16	8	⅝ x 2¾	.35
4½	9¼	7¾	2.50	3.35	2.90	3.75	15/16	8	¾ x 3	.70
5	10	8½	2.80	3.65	3.25	4.10	15/16	8	¾ x 3	.70
6	11	9½	3.20	4.00	3.70	4.50	1	8	¾ x 3	.70
7	12½	10¾	4.35	5.75	5.00	6.40	1 1/16	8	¾ x 3	.75
8	13½	11¾	5.00	6.50	5.75	7.25	1⅛	8	¾ x 3¼	.75
9	15	13¼	6.75	8.25	7.75	9.25	1⅛	12	¾ x 3¼	1.15
10	16	14¼	7.75	9.25	9.00	10.60	1 3/16	12	⅞ x 3½	1.70
12	19	17	10.50	12.50	14.00	16.00	1¼	12	⅞ x 3¾	1.70
14	21	18¾	13.75	16.00	17.50	19.75	1⅜	12	1 x 4¼	2.50
15	22¼	20	18.00	21.00	22.50	25.50	1⅜	16	1 x 4¼	3.30
16	23½	21¼	22.50	26.00	28.00	31.50	1 7/16	16	1 x 4¼	3.30
18	25	22¾	27.50	31.00	33.00	36.50	1 9/16	16	1⅛ x 4¾	5.00
20	27½	25	30.00	34.00	36.00	40.00	1 11/16	20	1⅛ x 5	6.20
22	29½	27¼	33.75	39.00	41.00	46.00	1 13/16	20	1⅛ x 5½	8.40
24	32	29½	41.00	46.00	50.00	55.00	1⅞	20	1⅛ x 5½	8.40

Furnished faced only, unless otherwise specified.

STANDARD REDUCING COMPANION FLANGES

FOR WORKING PRESSURES UP TO 125 POUNDS

Size Pipe, Inches	Outside Diameter of Flange, Inches	Price Each		Size Pipe, Inches	Outside Diameter of Flange, Inches	Price Each		Size Pipe, Inches	Outside Diameter of Flange, Inches	Price Each	
		Faced	Faced and Drilled			Faced	Faced and Drilled			Faced	Faced and Drilled
1½	7	$2.10	$3.00	4	12½	$6.50	$8.50	9	21	$20.00	$24.00
2	7	2.10	3.00	4½	12½	6.50	8.50	10	21	20.00	24.00
1½	7½	2.40	3.35	5	12½	6.50	8.50	12	21	20.00	24.00
2	7½	2.40	3.35	6	12½	6.50	8.50	8	22¼	27.00	31.50
2½	7½	2.40	3.35	2	13½	7.50	9.75	10	22¼	27.00	31.50
2	8½	2.70	3.75	2½	13½	7.50	9.75	12	22¼	27.00	31.50
2½	8½	2.70	3.75	3	13½	7.50	9.75	14	22¼	27.00	31.50
3	8½	2.70	3.75	4	13½	7.50	9.75	10	23½	34.00	39.00
2	9	3.25	4.50	5	13½	7.50	9.75	12	23½	34.00	39.00
2½	9	3.25	4.50	6	13½	7.50	9.75	14	23½	34.00	39.00
3	9	3.25	4.50	7	13½	7.50	9.75	15	23½	34.00	39.00
3½	9	3.25	4.50	6	15	10.00	12.25	12	25	41.00	46.00
2½	9¼	3.75	5.00	7	15	10.00	12.25	14	25	41.00	46.00
3	9¼	3.75	5.00	8	15	10.00	12.25	15	25	41.00	46.00
3½	9¼	3.75	5.00	2½	16	11.50	14.00	16	25	41.00	46.00
4	9¼	3.75	5.00	3	16	11.50	14.00	14	27½	45.00	51.00
2	10	4.25	5.50	3½	16	11.50	14.00	15	27½	45.00	51.00
2½	10	4.25	5.50	4	16	11.50	14.00	16	27½	45.00	51.00
3	10	4.25	5.50	5	16	11.50	14.00	18	27½	45.00	51.00
3½	10	4.25	5.50	6	16	11.50	14.00	15	29½	50.00	58.50
4	10	4.25	5.50	7	16	11.50	14.00	16	29½	50.00	58.50
4½	10	4.25	5.50	8	16	11.50	14.00	18	29½	50.00	58.50
2	11	4.75	6.00	9	16	11.50	14.00	20	29½	50.00	58.50
2½	11	4.75	6.00	6	19	15.75	18.75	14	32	61.00	70.00
3	11	4.75	6.00	7	19	15.75	18.75	16	32	61.00	70.00
3½	11	4.75	6.00	8	19	15.75	18.75	18	32	61.00	70.00
4	11	4.75	6.00	9	19	15.75	18.75	20	32	61.00	70.00
4½	11	4.75	6.00	10	19	15.75	18.75	..	...	.....	.....
5	11	4.75	6.00	8	21	20.00	24.00	..	...	.....	.....

Furnished faced only, unless otherwise specified.

These flanges will always be the same thickness as the regular companion flanges of the corresponding diameter and drilled to the template corresponding to outside diameter, unless otherwise ordered.

Templates for drilling, see list above.

Brass Valves
Iron Valves
Safety Valves
Pop Safety Valves

Brass Cocks
Iron Cocks
Asbestos Packed Cocks

Water Relief Valves
Expansion Joints
Compression and Ground
Key Bibbs
Brass Ball Cocks

Copper Balls
Steam Whistles
Water Columns

Pages 230 to 242 Inclusive

Brass Globe and Angle Valves

Globe—Fig. 498

STEAM METAL

Angle—Fig. 499

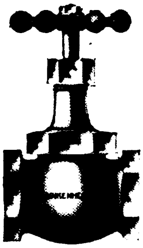
Size ....inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Globe or angle.......each	$0.72	.72	.77	1.00	1.26	1.80	2.52	3.50	5.30	10.00	14.40

Globe—Fig. 500

Fairbanks Brass Globe and Angle Valves

RENEWABLE VULCANIZED ASBESTOS DISC

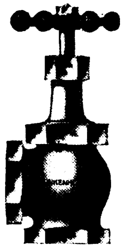
Size ....inches	⅛	¼	⅜	½	¾	1
Globe or angle valves............each	$1.10	1.10	1.25	1.60	2.20	2.80
Extra asbestos vulcanized discs.... "	.26	.28	.14	.18	.20	.24
Extra special metal discs.......... "	....	.44	.20	.24	.32	.40
Size ....inches	**1¼**	**1½**	**2**	**2½**	**3**	
Globe or angle valves...........each	$4.00	5.50	8.75	15.75	22.00	.....
Extra asbestos vulcanized discs... "	.36	.50	.72	.96	1.20	.....
Extra special metal discs......... "	.60	.80	1.20	2.20	3.30	.....



Globe—Fig. 501

Lunkenheimer Brass Medium Pattern Regrinding Valves

FOR WORKING PRESSURES UP TO 200 POUNDS
SCREW ENDS



Angle—Fig. 502

Size ....inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Globe or angle..each	$0.70	.70	.85	1.15	1.45	2.00	2.80	3.90	6.20	12.00	16.50	30.00	40.00

These valves can be reground without being removed from the pipe and can be packed under pressure.

Lunkenheimer "Ferrenewo" Globe and Angle Valves

SELF-CLEANSING SEAT—REGRINDING AND RENEWABLE SEAT AND DISC
FOR WORKING PRESSURES UP TO 150 POUNDS
SCREW ENDS

The "Ferrenewo" valves differ from the "Renewo" valves only in that they have a body made of "Hero" iron. It retains the nickel seat ring and all the other features of the "Renewo" valves and all parts will interchange with the exception of the union ring.

Made only in sizes ¾ to 2 inches.

Size ....inches	¾	1	1¼	1½	2
Globe or angle.......................each	$2.20	2.80	4.00	5.50	8.75

For "Renewo" valves, see page 232.

Globe—Fig. 503

Globe—Fig. 504

Lunkenheimer Brass "Renewo" Globe and Angle Valves

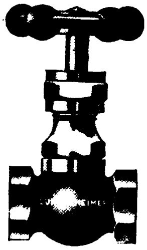
FOR WORKING PRESSURES UP TO 200 POUNDS
SCREW ENDS

These valves are provided with renewable nickel seats, which can easily be removed when necessary. They will, however, permit of considerable regrinding before it becomes necessary to renew them. It is not necessary to disconnect the valve from the pipe when either regrinding or removing the seat, and it can be packed under pressure.

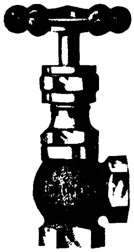
Size ....inches	¼	⅜	½	¾	1
Globe or angle valves...........each	$1.10	1.25	1.60	2.20	2.80
Size ....inches	1¼	1½	2	2½	3
Globe or angle valves...........each	$4.00	5.50	8.75	15.75	22.00

Lunkenheimer Brass Needle Globe and Angle Valves

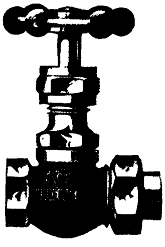
BRASS STEM



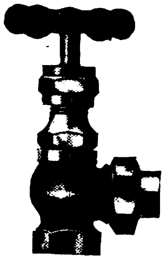
Globe—Fig. 505



Angle—Fig. 506



Globe with Union
Fig. 507



Angle with Union
Fig. 508

Size ....inches	⅛	¼	⅜	½	¾
Globe or angle, rough body, finished trimmings, female ends .each	$0.65	.75	.85	1.60	2.00
Globe or angle, rough body, finished trimmings, female union on one end ....each	.80	.95	1.15	1.95	3.10

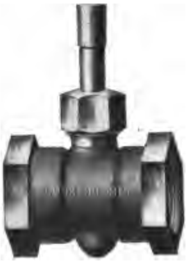


Fig. 509

Lunkenheimer Brass Butterfly Valves

FOR WORKING PRESSURES UP TO 150 POUNDS

Size ....inches	¾	1	1¼	1½	2	2½	3
Face to face.........inches	$2\frac{5}{16}$	$2\frac{11}{16}$	3⅛	$3\frac{5}{16}$	$3\frac{15}{16}$	$4\frac{9}{16}$	$5\frac{9}{16}$
From center of body to top of stem...........	2⅞	3⅜	$3\frac{3}{16}$	4	4⅜	5⅜	$5\frac{7}{16}$
Each	$3.10	4.40	5.65	6.75	10.00	13.75	21.00

Pratt and Cady Brass Swing Check Valves

MAY BE USED IN A HORIZONTAL OR VERTICAL POSITION

Size ....inches	¼	⅜	½	¾	1	1¼	1½	2
Each	$1.30	1.30	1.50	1.75	2.25	3.25	4.25	6.25

Fig. 510

Standard Brass Check Valves

STEAM METAL

Horizontal—Fig. 511

Vertical—Fig. 512

Angle—Fig. 513

Size ....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Horizontal ....each	$0.65	.65	.70	.90	1.15	1.60	2.25	3.15	4.75	9.00	13.00
Vertical or angle..... "	.....	.72	.77	1.00	1.26	1.80	2.52	3.50	5.30	.....	.....

Lunkenheimer Brass Regrinding Check Valves

MEDIUM PATTERN
FOR WORKING PRESSURES UP TO 200 POUNDS
SCREW ENDS

Angle—Fig. 514

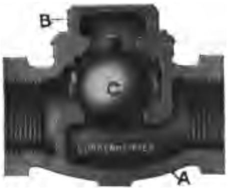
Horizontal—Fig. 515

Vertical—Fig. 516

Size ....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Angle, horizontal or vertical ....each	$0.50	.50	.60	.85	1.15	1.55	2.30	3.25	5.20	10.00	14.00

Lunkenheimer Brass Medium Pattern Ball Check Valves

FOR WORKING PRESSURES UP TO 200 POUNDS
SCREW ENDS



Horizontal Ball Check Valve
Fig. 517

Size ....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Horizontal ....each	$0.85	.95	1.10	1.60	2.30	3.50	5.30	7.50	11.50	18.00	27.00

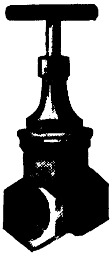


Fig. 518

Standard Brass Gate Valves

DOUBLE DISC PATTERN
FOR WORKING PRESSURES UP TO 125 POUNDS

Size ....inches	¼	⅜	½	¾	1
Each	$1.25	1.25	1.30	1.75	2.50
Size ....inches	1¼	1½	2	2½	3
Each	$3.50	5.00	7.50	14.00	20.00

Pratt and Cady
Brass Quick Opening Gate Valves

RENEWABLE VULCANIZED ASBESTOS SEAT RINGS
SLIDING STEM AND IRON LEVER

Size ....inches	½	¾	1	1¼	1½	2	2½	3
Each	$3.25	3.25	4.50	6.00	8.00	12.00	22.00	30.00

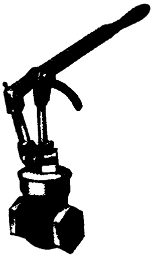


Fig. 519

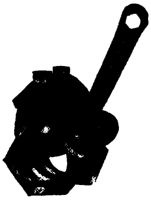


Fig. 520

Lunkenheimer Brass "Handy" Gate Valves

SCREW ENDS ONLY
For Working Pressures not Exceeding
75 Pounds

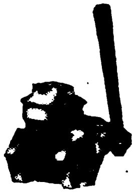


Fig. 521

Lunkenheimer Brass Lever Throttle Valves

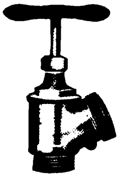
SCREW ENDS ONLY
For Working Pressures up to 175 Pounds

Size ....inches	½	¾	1	1¼	1½	2	2½	3
Handy gate valves......................each	$1.60	1.80	2.50	3.50	5.00	7.50	13.50	19.00
Lever throttle valves .... "	.....	3.00	4.00	5.00	7.00	10.00	19.00	.....

Handy gate valves and lever throttle valves can also be furnished in iron body brass mounted or all iron. Prices upon application.

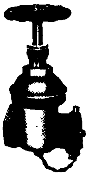
Standard Brass Hose Valves

STANDARD BRASS HOSE VALVES



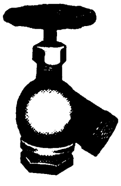
Chicago Pattern
Fig. 522

STANDARD BRASS HOSE GATE VALVES

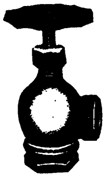


With Iron Wheel
Fig. 523

STANDARD BRASS GARDEN HOSE VALVES



Bent Nose
Fig. 524



Straight Nose
Fig. 525

With Leather Disc

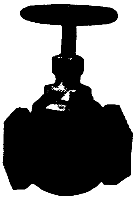
Size ....inches	½	¾	1	1¼	1½	2	2½
Chicago pattern hose valves, rough..............each	.....	.....	$3.15	3.70	4.75	7.00	8.50
Hose gate valves, with brass cap and chain..... "	.....	.....	3.75	4.85	6.50	9.25	16.50
Hose gate valves, without cap and chain......... "	.....	.....	2.50	3.50	5.00	7.50	14.00
Garden hose valves, with bent nose............. "	$1.65	1.65	2.20	3.40	4.75	7.00	15.00
Garden hose valves, with straight nose.......... "	1.65	1.65	2.20	3.40	4.75	7.00	15.00

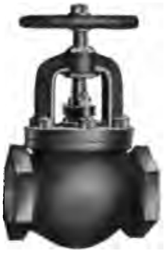
Chicago pattern hose valves have iron pipe thread on bottom, and are made with California hose thread on the side.

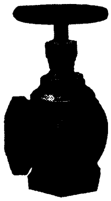
Bent nose garden hose valves will be furnished unless otherwise specified.

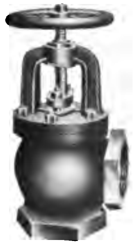
Standard Iron Body Valves

BRASS MOUNTED
SCREWED OR FLANGED
FOR WORKING PRESSURES UP TO 150 POUNDS


Globe—Plain
Screw Ends
Fig. 526


Globe—With Yoke
Screw Ends
Fig. 527


Angle—Plain
Screw Ends
Fig. 528


Angle—With Yoke
Screw Ends
Fig. 529

Size ....inches	2	2½	3	3½	4	4½	5
Globe and angle valves, screwed, plain ....each	$ 5.40	7.35	9.80	......	......	......	......
Globe and angle valves, screwed, with yoke.. "	7.00	9.00	12.50	15.25	19.00	24.00	27.00
Globe and angle valves, flanged, plain ...... "	7.00	9.00	12.50	......	......	......	......
Globe and angle valves, flanged, with yoke.. "	8.60	10.75	15.00	18.50	22.50	27.50	31.00
Diameter of flanges....................inches	6	7	7½	8½	9	9½	10

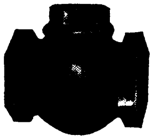
Size ....inches	6	7	8	9	10	12	
Globe and angle valves, screwed, with yoke.each	$37.50	63.00	72.00	100.00	114.00	170.00	......
Globe and angle valves, flanged, with yoke.. "	42.00	68.00	77.00	110.00	123.00	187.00	......
Diameter of flanges....................inches	11	12½	13½	15	16	19	

Screw end valves will be furnished unless otherwise specified.

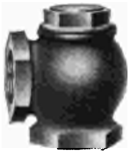
Standard Iron Body Check Valves

SCREWED OR FLANGED
FOR WORKING PRESSURES UP TO 150 POUNDS

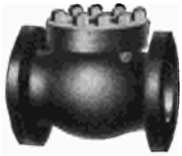
BRASS MOUNTED


Horizontal Check
Screw Ends
Fig. 530

BRASS MOUNTED


Angle Check
Screw Ends
Fig. 531

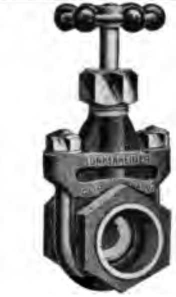
BRASS SEAT


Swing Check—Flanged Ends
May Be Used in a Horizontal
or Vertical Position
Fig. 532

Size ....inches	2	2½	3	3½	4	4½
Horizontal or angle, screwed....................each	$ 3.60	6.50	8.90	12.25	14.25	19.00
Vertical, screwed .... "	......	9.50	12.50	17.00	21.00	30.00
Swing, screwed .... "	......	12.00	13.50	17.50	20.00	26.00
Horizontal or angle, flanged.................... "	5.25	8.25	11.50	15.50	18.00	22.50
Vertical, flanged .... "	......	11.50	15.00	20.00	25.00	33.50
Swing, flanged .... "	......	14.50	17.00	21.00	24.00	30.00
Diameter of flanges....................inches	6	7	7½	8½	9	9½

Size ....inches	5	6	7	8	10	12
Horizontal or angle, screwed....................each	$22.00	30.00	45.00	57.00	105.00	155.00
Vertical, screwed .... "	33.00	40.00	62.00	73.00	......	......
Swing, screwed .... "	30.00	36.00	55.00	70.00	110.00	160.00
Horizontal or angle, flanged .... "	26.00	35.00	50.00	62.00	115.00	175.00
Vertical, flanged .... "	37.00	45.00	67.00	78.00	135.00	......
Swing, flanged .... "	34.00	41.00	60.00	75.00	115.00	168.00
Diameter of flanges....................inches	10	11	12½	13½	16	19

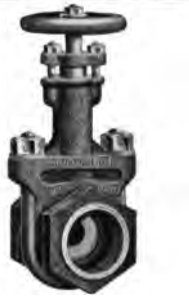
Screw end valves will be furnished unless otherwise specified.



Lunkenheimer Double Seated "Clip" Gate Valves

FOR WORKING PRESSURES UP TO 100 POUNDS

IRON BODY BRASS MOUNTED
OR
ALL IRON



Screw Ends—½" to 2"
Inclusive
Fig. 533

Screw Ends—2½" to 6"
Inclusive
Fig. 534

Size ....inches	½	¾	1	1¼	1½	2	2½	3	3½	4
Iron body brass mounted....each	$2.00	2.35	2.50	3.50	5.00	7.50	12.00	15.00	20.00	22.00
All iron .... "	2.00	2.35	2.50	3.50	5.00	7.50	12.00	15.00	18.00	20.00

2½-inch and 3-inch valves can be furnished with 11½ threads per inch for oil well tubing.

Standard Iron Body Gate Valves

BRASS MOUNTED
FOR WORKING PRESSURES UP TO 150 POUNDS
NON-RISING STEM

Screwed—Fig. 535

Flanged—Fig. 536

Hub End—Fig. 537

Size ....inches	2	2½	3	3½	4	4½	5
Screwed ....each	$10.00	11.50	14.00	17.00	19.00	24.00	27.50
Flanged .... "	12.00	13.50	16.50	19.50	23.00	28.00	31.50
Hub end .... "	10.00	......	14.00	......	19.00	......	27.50
Size ....inches	6	7	8	9	10	12	
Screwed ....each	$32.50	45.00	54.00	76.00	90.00	125.00	......
Flanged .... "	36.50	49.00	58.00	81.00	95.00	133.00	......
Hub end .... "	32.50	45.00	54.00	......	90.00	125.00	......

Valves will be furnished with stems turning to left to open, unless otherwise ordered. Standard iron body gate valves also carried in stock threaded for 10, 11½ and 14 thread casing.

Extra Heavy Iron Body Gate Valves

BRASS MOUNTED
FOR WORKING PRESSURES UP TO 250 POUNDS
NON-RISING STEM
(Not Illustrated)

Size ....inches	2	2½	3	3½	4	4½	5
Screwed ....each	$ 27.50	33.00	45.00	57.00	60.00	77.00	85.00
Flanged .... "	30.00	35.50	48.00	60.00	65.00	82.00	90.00
Size ....inches	6	7	8	9	10	12	
Screwed ....each	$100.00	125.00	155.00	225.00	250.00	......	......
Flanged .... "	107.00	132.00	162.00	232.00	258.00	335.00	......

Valves will be furnished with stems turning to left to open, unless otherwise ordered.

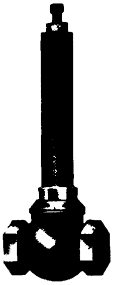


Fig. 538

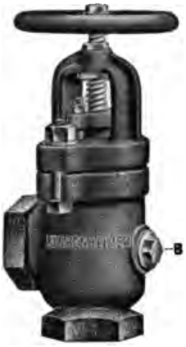
Advance Brass Relief Valves

SIMPLE, AUTOMATIC, DURABLE—FOR OIL, WATER, GAS OR STEAM

FOR WORKING PRESSURES UP TO 250 POUNDS

ESPECIALLY ADAPTED FOR SPRAYING OUTFITS AND OIL BURNING PLANTS

Size ....inches	½	¾	1	1¼	1½
Each	$1.75	2.25	2.50	2.75	3.00


Screwed
Fig. 539

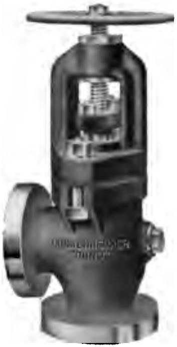
Lunkenheimer "Duro" Blow-off Valves

WITH SELF-CLEANSING SEAT

IRON BODY BRASS MOUNTED

FOR WORKING PRESSURES UP TO 250 POUNDS

Size ....inches	1¼	1½	2	2½	3
Screwed ....each	$10.70	12.50	16.00	21.00	27.50
Flanged .... "	12.00	14.00	18.00	23.00	30.00


Flanged
Fig. 540

Standard Iron Foot Valves

WITH STRAINERS

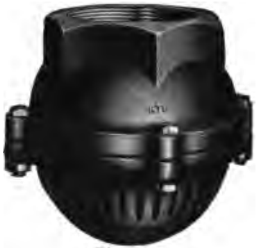


Fig. 541

Size ....inches	¾	1	1¼	1½	2	2½	3
Black, screwed ....each	$0.42	.44	.52	.65	.90	1.30	1.85
Galvanized, screwed .... "	.60	.60	.75	1.00	1.45	2.00	2.70
Black, flanged .... "	.....	.....	.....	.....	.....	.....	2.50
Largest outside diameter.....................inches	4⅛	4⅛	4⅜	5 1/16	5 15/16	6 13/16	8⅛
Size ....inches	**3½**	**4**	**4½**	**5**	**6**	**7**	**8**
Black, screwed ....each	$2.60	2.80	4.00	4.25	7.00	16.00	16.00
Galvanized, screwed .... "	3.90	4.25	6.25	6.50	10.00	30.00	30.00
Black, flanged .... "	3.25	3.60	4.75	5.00	8.00	17.00	17.00
Largest outside diameter ....inches	9 7/16	9 7/16	9 7/16	12½	12½	13⅛	15¼

Foot valves with casing thread also carried in stock.

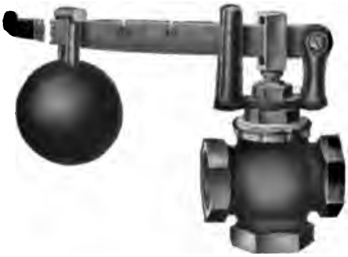


Fig. 542

Standard Brass Safety Valves

FOR WORKING PRESSURES UP TO 125 POUNDS

CROSS PATTERN

Size ...inches	¼	⅜	½	¾	1	1¼	1½	2
Brass disc..ea.	$2.20	2.50	3.25	3.90	4.70	7.15	9.00	12.50

Standard Iron Body Safety Valves

BRASS MOUNTED
FOR WORKING PRESSURES UP TO 125 POUNDS
SCREWED OR FLANGED

Size ..inches	2	2½	3	3½	4	4½	5	6
Screwed .ea.	$ 7.80	13.25	17.25	23.00	28.75	34.50	41.50	57.75
Flanged ..ea.	10.25	16.00	21.50	27.50	34.00	40.00	48.00	65.00
Diameter of flanges .in.	6	7	7½	8½	9	9½	10	11

Globe and angle safety valves can be furnished at same list.

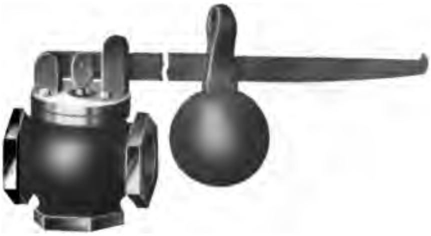
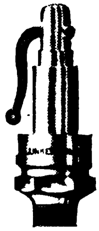


Fig. 543

Lunkenheimer "Sentinel" Brass Improved Pattern Pop Safety Valves

FOR STATIONARY, PORTABLE AND MARINE STEAM BOILERS

TOP OR ANGLE OUTLET

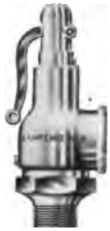


Top Outlet
Fig. 544

Size, Inches	Suitable For Boilers, Horsepower	Top Outlet Male Inlet, Each	Angle Outlet Male Inlet Female Outlet, Each
½	....	$ 6.00	$ 6.50
¾	6 to 8	6.50	7.00
1	8 to 10	7.50	8.20
1¼	10 to 15	9.00	9.80
1½	20 to 30	11.50	12.40
2	35 to 50	18.00	19.50
2½	60 to 75	28.00	30.00
3	75 to 100	38.00	41.00

In ordering, always state pressure valves are wanted set to blow off. Give figure number of valve, and always specify when wanted for marine service.

Every valve thoroughly tested and guaranteed to work perfectly at any pressure specified up to 250 pounds.



Angle Outlet
Fig. 545

Iron Case Pop Safety Valves

FOR STATIONARY AND MARINE BOILERS

SCREWED OR FLANGED

This valve is furnished with flat seats for stationary boilers, and with beveled seats at an angle or forty-five degrees for marine boilers. It has been approved by the United States Board of Supervising Inspectors of steam vessels.

Each valve is carefully adjusted and tested before leaving the factory.

Always state highest pressure to be carried and size of boiler.

Valves furnished either screwed or flanged base connections.

Iron case and best steam metal.

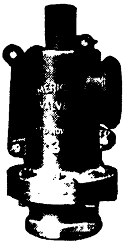


Fig. 546

Size ....inches	2	2½	3	3½	4
With bronze seat.......................each	$35.00	42.00	50.00	68.00	75.00
With nickel seat......................... "	40.00	48.00	57.00	75.00	87.00
For boilers, H. P........................	30 to 40	40 to 75	75 to 100	100 to 125	125 to 150
Estimated weight, screwed ....pounds	23	36	49	67	87
Estimated weight, flanged .... "	30	44	60	80	102

Standard Brass Steam and Gas Service Cocks

Brass Three-Way Steam Cocks

Flat Head—Fig. 547

Square Head—Fig. 548

Three-Way—Fig. 549

Size .... inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Steam cocks, square or flat head.... each	$0.85	1.00	1.25	1.70	2.35	3.70	4.85	7.30	14.50	22.50
Gas service cocks, square or flat head .... "	.75	.85	.95	1.15	1.50	2.25	3.10	5.00	11.00	16.00
Three-way steam cocks, square head "	1.80	2.10	2.50	3.00	3.75	5.75	7.15	11.00	18.75	26.00

Square head steam, gas service and three-way cocks will be furnished unless otherwise specified.

Malleable Iron Wrenches

FOR SQUARE HEAD BRASS STEAM AND GAS SERVICE COCKS

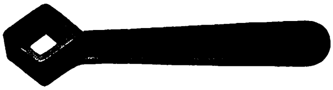


Fig. 550

Size of cock.............................. inches	⅜	½	¾	1	1¼	1½	2	2½
Square head, steam .... each	$0.06	.07	.09	.14	.19	.25	.44	.56
Square head, gas service .... "	.06	.07	.09	.14	.19	.25	.44	.56

In ordering wrenches, specify size of opening desired.

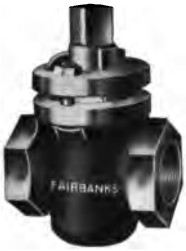
Standard Iron Cocks

SQUARE HEAD
FOR WORKING PRESSURES UP TO 125 POUNDS

Screw Ends—Fig. 551

Size .... inches	½	¾	1	1¼	1½	2	2½	3	3½	4
All iron .... each	$0.90	1.05	1.30	1.60	1.95	2.70	4.40	6.75	12.00	15.50
Iron, with brass washer .... "	1.00	1.20	1.55	1.95	2.35	3.20	5.15	7.75	14.00	19.00
Iron, with brass plug and iron washer .... "	1.30	1.60	1.90	2.65	3.75	5.25	8.75	13.00	27.50	36.50
Iron, with brass plug and brass washer .... "	1.40	1.75	2.15	3.00	4.15	5.75	9.50	14.00	29.50	40.00

2½-inch and 3-inch cocks can be furnished with 11½ threads per inch for oil well tubing.



Vulcanized Asbestos Packed Iron Cocks

SCREW ENDS

FOR WORKING PRESSURES UP TO 125 POUNDS

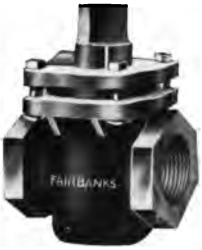


Fig. 552

Fig. 553

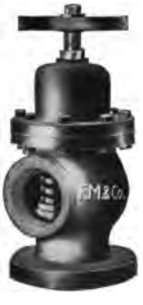
Size .... inches	⅛	¼	⅜	½	¾	1	1¼	1½
Price .... each	$1.30	1.30	1.45	1.60	2.10	2.50	3.50	4.75
Renewable vulcanized asbestos top rings... "	.....	.25	.25	.25	.25	.25	.25	.30
Renewable "U" shape vulcanized asbestos bushings .... "	.....	.....	.....	.75	.75	1.00	1.40	1.90
Size .... inches	2	2½	3	3½	4	5	6	.....
Price .... each	$7.00	12.00	18.00	27.00	30.00	45.00	60.00	.....
Renewable vulcanized asbestos top rings... "	.40	.50	1.00	1.30	1.50	2.50	5.00	.....
Renewable "U" shape vulcanized asbestos bushings .... "	2.40	2.90	3.50	.....	.....	.....	.....	.....

These cocks can also be furnished with flanged ends in sizes 1-inch and larger at the same list prices.

Standard Water Relief Valves

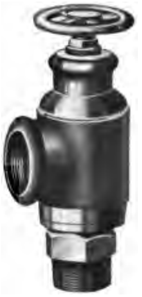
IRON BODY—BRASS SEAT

FOR WORKING PRESSURES UP TO 250 POUNDS



Iron Body
Fig. 554

Size, Inches	Diameter of Base Flange, Inches	Center of Outlet to Bottom of Base Flange, Inches	Diameter of Outlet Flange, Inches	Center of Valve to End of Outlet, Inches		Total Height, Inches	Price, Each
2½	7½	5¼	These Sizes Made With Screwed Outlet, Unless Otherwise Specified	3⅞	Screwed Outlet	17⅞	$42.00
3	8¼	5¾		4¼		18⅞	50.00
3½	9	6$\frac{3}{16}$		4⅝		20⅜	68.00
4	10	6$\frac{11}{16}$		5		21	75.00
4½	10½	7⅛		6		22½	100.00
5	11	7⅜	10	7$\frac{5}{16}$	Flanged Outlet	23⅛	120.00
6	12½	8½	11	8⅛		25⅞	170.00

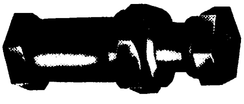


Brass
Fig. 555

BRASS

Size .... inches	½	¾	1	1¼	1½	2	2¼	2½	3
Price .... each	$11.00	11.00	13.00	16.00	19.00	29.00	38.00	46.00	77.00

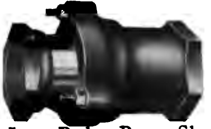
In ordering, always specify the style number and pressure at which valves are to be set.



All Brass
Fig. 556

Standard Expansion Joints

FOR WORKING PRESSURES
UP TO 125 POUNDS
STANDARD TRAVERSE



Iron Body Brass Sleeve
Fig. 557

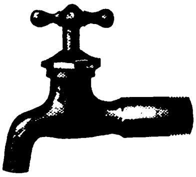
Size .... inches Traverse .... inches	½ 2	¾ 2¼	1 2¼	1¼ 2¼	1½ 2¼	2 2½	2½ 2½	3 2¾	3½ 3
All brass .... each	$ 1.50	2.20	2.75	4.00	5.00	8.00	17.50	24.00	......
Iron body, screwed .... "	......	.....	.....	.....	......	7.00	8.00	10.00	14.00
Iron body, flanged .... "	......	.....	.....	.....	......	15.00	16.00	18.50	25.00
Size .... inches Traverse .... inches	4 3¼	4½ 3½	5 4	6 5	7 6	8 7	9 7	10 7	12 8
Iron body, screwed .... each	$18.00	30.00	38.00	45.00	70.00	100.00	110.00	160.00	225.00
Iron body, flanged .... "	30.00	40.00	48.00	55.00	80.00	110.00	120.00	175.00	250.00

Any length traverse can be furnished to order.

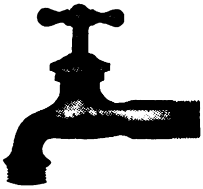
Under ordinary steam service conditions, an allowance of about one inch in 50 feet of pipe should be made for expansion.

Standard Compression Bibbs

SCREW ON TAIL (S. O. T.) FOR IRON PIPE



Plain—Fig. 558



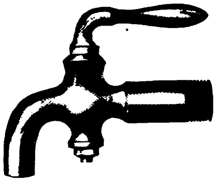
Hose—Fig. 559

Size ....inches	⅜	½	⅝	¾	1	1¼	1½	2
Plain, rough ....per dozen	$15.00	15.60	22.20	29.40	51.00	96.00	126.00	252.00
Plain, finished .... "	15.60	16.20	23.40	30.60	54.00	99.00	132.00	264.00
Plain, nickel plated .... "	18.60	19.20	26.40	34.20	58.80	108.00	144.00	288.00
Hose, rough .... "	17.40	18.00	24.60	31.80	57.00	105.00	138.00	270.00
Hose, finished .... "	18.00	18.60	25.80	33.00	60.00	108.00	144.00	282.00
Hose, nickel plated .... "	21.00	21.60	28.80	36.60	64.80	117.00	156.00	306.00

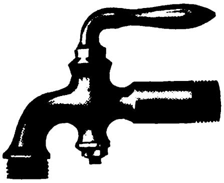
Ground Key Bibbs

CAST LEVER HANDLE

SCREW ON TAIL (S. O. T.) FOR IRON PIPE



Plain—Fig. 560



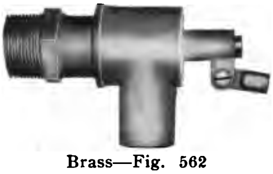
Hose—Fig. 561

Size ....inches	⅜	½	⅝	¾	1	1¼	1½	2
Plain, rough ....per dozen	$19.20	20.40	28.80	34.80	48.00	79.20	117.00	210.00
Plain, finished .... "	23.40	24.60	33.60	40.80	57.00	91.20	135.00	234.00
Plain, nickel plated .... "	27.60	28.80	38.40	46.80	66.00	103.20	153.00	258.00
Hose, rough .... "	21.60	22.80	31.20	37.20	54.00	88.20	129.00	228.00
Hose, finished .... "	25.80	27.00	36.00	43.20	63.00	100.20	147.00	252.00
Hose, nickel plated .... "	30.00	31.20	40.80	49.20	72.00	112.20	165.00	276.00

1½-inch rough plain and hose bibbs can be furnished with detachable malleable iron handles and horn on spout for hanging pail.

Ball Cocks

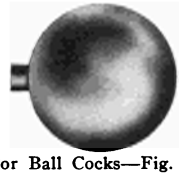
IMPROVED COMPRESSION



Brass—Fig. 562

Copper Balls

FOR OPEN TANKS



For Ball Cocks—Fig. 563

BALL COCKS WITH RODS—IRON PIPE THREAD

Size ....inches	⅜	½	⅝	¾	1	1¼	1½	2
Rough ....per dozen	$14.40	15.00	21.00	27.00	45.00	72.00	90.00	168.00

Ball cocks, ⅜-inch to ¾-inch, inclusive, are furnished with rods ¼-inch in diameter and 9 inches long, with 24 threads; sizes 1-inch to 2 inches, inclusive, with rods ⅜-inch in diameter and 14 inches long, with 20 threads.

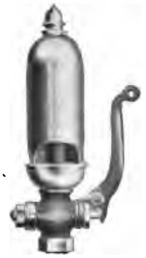
COPPER BALLS

Size ....inches	5	6	7	8	10	12
Balls only ....per dozen	$8.00	12.00	20.00	32.00	66.00	100.00
Rods only .... "	1.70	1.70	1.70	4.00	4.00	4.00
Size of rods ....inches	¼x9	¼x9	¼x9	⅜x14	⅜x14	⅜x14

Brass Steam Whistles

SINGLE BELL CHIME WHISTLES

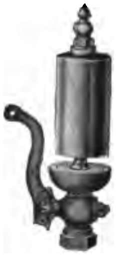
WITH VALVE



All Brass with
Adjustable Lever
Fig. 564

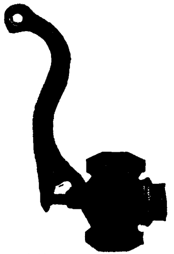
PLAIN STEAM WHISTLES

WITH VALVE



All Brass with
Adjustable Lever
Fig. 565

PLAIN WHISTLE VALVES



All Brass with
Adjustable Lever
Fig. 566

Diameter of bell..............inches	1½	2	2½	3	3½	4	5	6	8
Size pipe connection...........inches	⅜	½	¾	¾	1	1¼	1½	1½	2
Lunkenheimer single bell chime whistles, with valve..........each	$7.00	10.00	13.00	16.00	22.00	28.00	44.00	60.00	145.00
Plain steam whistles, with valve... "	4.00	5.50	6.50	8.50	11.50	15.00	22.50	33.00	95.00

PLAIN BRASS WHISTLE VALVES

WITH ADJUSTABLE LEVER

Size ....inches	⅜	½	¾	1	1¼	1½	2	2½	3
Price ....each	$2,00	2.50	3.00	3.50	5.00	6.00	9.00	18.00	27.00

Standard Cast Iron Water Columns

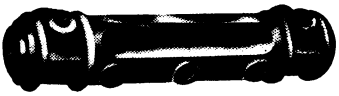
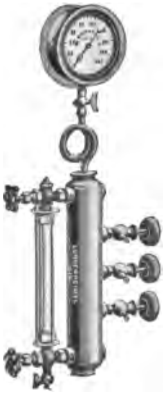


Fig. 567

Number	1	2	3	4	5
Center to center boiler connections ....inches	10	12½	14	18	.....
" " " water gauge connections .... "	10	12½	14	18	13⅜
" " " gauge cocks .... "	3⅜	3¾	4¼	4	3⅝
Extreme length .... "	13⅛	16½	19	22⅜	20¼
Tapped for boiler connections .... "	½	¾	¾	1¼	....
" " water gauge connections .... "	½	½	¾	¾	½
" " gauge cocks .... "	⅜	½	½	¾	½
" " top and bottom .... "	¾	1	¾	1¼	1¼
Price ....each	$2.75	4.00	6.00	8.00	7.50

With No. 5 the connection to boiler is made from top and bottom of column.

No. 3 column can also be furnished tapped ½-inch and 1¼-inch for boiler connection.



Combination Water
Column with
Steam Gauge
Fig. 568

Lunkenheimer Combination Water Columns

IRON BODY BRASS MOUNTED

No. 1—Combination iron column, 2¼-inches in diameter, furnished with one 2-rod, part finished gauge, ½-inch pipe, ⅝x10-inch glass, three ⅜-inch soft seat compression gauge cocks and two ½-inch brass unions for boiler connections, (without steam gauge) ....each	$13.00
No. 1—Plain iron column without trimmings................each	3.60
No. 2—Combination iron column, 2¾-inches in diameter, furnished with one 3-rod, part finished gauge, ½-inch pipe, ⅝x10½-inch glass, three ⅜-inch soft seat compression gauge cocks and two ½-inch brass unions for boiler connections, (without steam gauge) ....each	15.00
No. 2—Plain iron column without trimmings................each	5.00
No. 3—Combination iron column, 3½-inches in diameter, furnished with one 3-rod, part finished gauge, ¾-inch pipe, ¾x12-inch glass, three ½-inch regrinding gauge cocks, (without steam gauge) ....each	19.00
No. 3—Plain iron column without trimmings................each	6.00

Air Cocks
Gauge Cocks
Gauges

Water Gauges
Gauge Glasses
Flue Scrapers
Flue Blowers
Tube Expanders

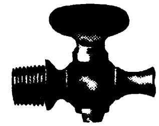
Injectors
Ejectors
Jet Pumps

Nason Steam Traps
Trident Water Meters
Little Giant Gas Regulators
Moran Joints

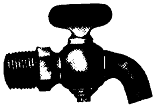
Pages 243 to 253 Inclusive

Air Cocks

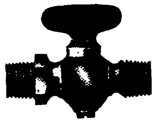
STEAM METAL



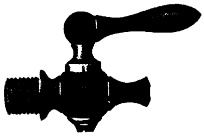
Single Male Thread, Tee Handle
Fig. 569



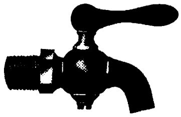
Single Male Thread, Tee Handle
Bibb Nose—Fig. 570



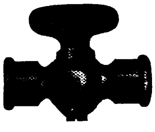
Double Male Thread, Tee Handle
Fig. 571



Single Male Thread, Lever Handle
Fig. 572



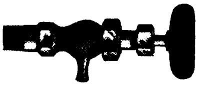
Single Male Thread,
Lever Handle
Bibb Nose—Fig. 573



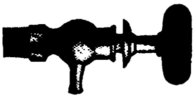
Double Female Thread,
Tee Handle
Fig. 574

Size of iron pipe thread....................................inches	⅛	¼	⅜	½
Single male thread, tee handle ....each	$0.40	$0.45	$0.50	$0.60
Single male thread, lever handle .... “	.55	.60	.65	.75
Double male thread, tee handle .... “	.55	.65	.75	.90
Double male thread, lever handle .... “	.70	.80	.90	1.05
Double female thread, tee handle .... “	.65	.70	.85	1.10
Double female thread, lever handle .... “	.80	.85	1.00	1.25
Male and female thread, tee handle .... “	.75	.80	.90	.....
Male and female thread, lever handle .... “	.90	.95	1.05	.....
Single male thread, tee handle, bibb nose.................. “	.70	.80	.90	1.00
Single male thread, lever handle, bibb nose................ “	.85	.95	1.05	1.15

Lunkenheimer Compression Gauge Cocks



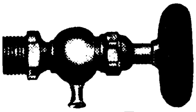
Regrinding Compression
Gauge Cock—Fig. 575



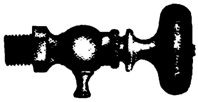
Soft Seat Compression
Gauge Cock—Fig. 576

Number Size of iron pipe thread ....inches	00 ¼	0 ⅜	1 ½	2 ¾
Regrinding compression gauge cock ....each	$1.15	1.20	1.30	1.80
Soft seat compression gauge cock .... “	.95	1.05	1.15	1.25

Compression Gauge Cocks



With Stuffing Box
Fig. 577



Without Stuffing Box
Fig. 578

Size of iron pipe thread ....inches	¼	⅜	½	¾
With stuffing box, brass finished ....each	.....	$1.20	1.30	1.45
Without stuffing box, brass finished .... “	$0.90	.95	1.00	1.25

Ball Gauge Cocks

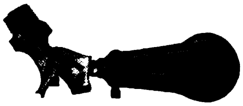


Fig. 579

Size of iron pipe thread...inches	½	¾
Price ....each	$0.55	.60

Steam Gauge Syphons

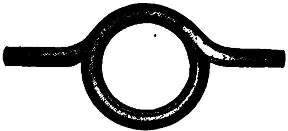
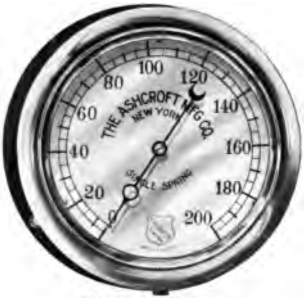


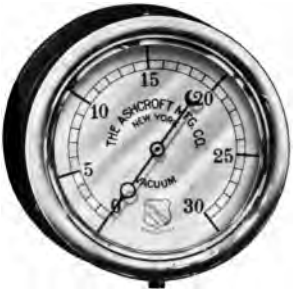
Fig. 580

Size of iron pipe thread ....inches	¼
8 inches long ....each	$0.50



Pressure Gauge
Fig. 581

Single Spring Pressure and Vacuum Gauges

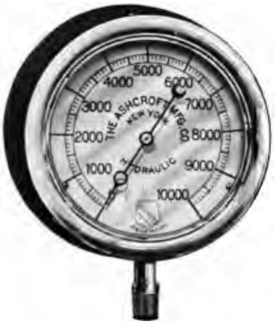


Vacuum Gauge
Fig. 582

Adapted for steam, air, gas, water and any fluid-pressure that will not affect its brass tube spring.

Size Dial, Inches	Iron Case with Brass Ring, Each	Iron Case with Nickel Plated Ring, Each	Brass Case, Each	Brass Case Nickel Plated All Over, Each	Standard Graduations of Dial Pressures
12	$50.00	$51.50	$75.00	$79.00	30—100—200 250—300—500
10	32.00	33.00	40.00	43.00	
8½	22.00	22.75	30.00	32.50	
6¾	16.00	16.60	20.00	22.00	30—100—200 250—300—500—1000
6	13.00	13.50	16.00	17.50	30— 60— 100 160—200— 250 300—500—1000
5½	10.00	10.25	12.00	13.25	
5	8.00	8.20	11.00	12.00	
4½	8.00	8.20	10.00	11.00	30— 60—100—160 200—250—300—500
3½	7.00	7.18	9.00	9.75	30— 60—100 160—200—250—300
3	6.00	6.15	8.00	8.60	30—100 160—200—300
2½	6.00	6.15	8.00	8.60	

Unless otherwise specified, iron case gauges with brass ring will always be furnished.



Hydraulic Gauge
Fig. 583

The above prices include a tee handle cock for sizes 3-inch to 6¾-inch, inclusive, a small union cock for sizes 8½-inch and 10-inch and a large union cock for size 12-inch.

The connection is ⅛-inch male bottom on the 2½-inch size, and ¼-inch male bottom on all larger sizes.

All gauges, particularly when used for steam pressure, should be graduated to double their working pressure, if the greatest durability is desired.

No steam gauge warranted if used without a syphon of sufficient capacity to fill gauge spring with water and keep it cool.

Vacuum gauges, unless otherwise specified, will always be furnished graduated to 30 inches. They can be graduated to equivalent in pounds if so desired.

Hydraulic Gauges

WITH STEEL SPRING

All hydraulic gauges should be graduated to double their working pressure. They are furnished with a check valve to protect the gauge spring against the shock attending the sudden admission and release of pressure.

Steel spring gauges always recommended in preference to brass spring for graduations exceeding 1,000 pounds.

Size Dial, Inches	Iron Case with Brass Ring, Each	Iron Case with Nickel Plated Ring, Each	Brass Case, Each	Brass Case Nickel Plated All Over, Each	Standard Graduations of Dial Pressures
8½	$70.00	$70.75	$80.00	$82.50	2000—5000 10000—15000 20000
6¾	50.00	50.60	60.00	62.00	
6	35.00	35.50	40.00	41.50	
5	30.00	30.50	35.00	36.00	
4½	25.00	25.50	30.00	31.00	

Unless otherwise specified, iron case gauges with brass ring will always be furnished.

No cocks are furnished with these gauges. The connection is ½-inch male bottom, with wrench square for use in connecting the gauge.

For gauges with maximum hand, add $5.00 to list prices.

"Safeguard" Automatic Water Gauges

Exterior

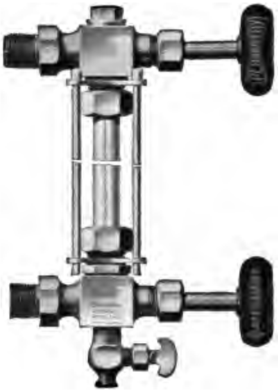


Fig. 584

TESTED
TO 300 POUNDS

Sectional

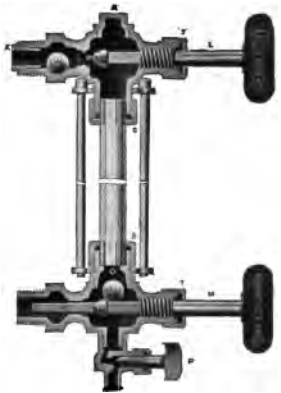


Fig. 585

The "Safeguard" automatic water gauge is constructed of the best steam bronze metal. It has but two moving parts, the automatic ball valves which are so constructed that their action is absolutely dependable at all times. All interior parts are self-cleaning by the action of the blow-off, so that the automatic action cannot be hindered in any way. It can be used with safety on very high steam pressures. This gauge is the one certain protection against all accidents and injuries due to the breaking of gauge glasses.

Size shank ....inches	½	¾
Size glass ....inches	⅝x12	¾x16
Number guards	4	4
Price ....each	$5.00	6.50

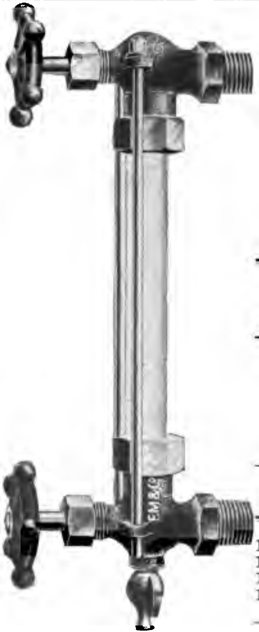


Fig. 586

Self-Cleaning Water Gauges

ROUGH ROUND BODY, BRONZED, IRON WHEELS

Size Number	Size Glass, Inches	Boiler Connections, Inches	Number Guards	Price, Each
1	⅝ x 12	½	2	Upon Application
2	⅝ x 12	½	3	"
3	⅝ x 12	½	4	"
4	¾ x 12	½	3	"
5	¾ x 12	¾	3	"
6	¾ x 16	¾	3	"

EXTRA BRASS GUARDS FOR WATER GAUGES

12 inches long........each	$0.09	20 inches long........each	$0.20
14 " " .... "	.10	24 " " .... "	.25
16 " " .... "	.12	30 " " .... "	.30
18 " " .... "	.15	36 " " .... "	.40

Longer guards to order.

Genuine Scotch Gauge Glasses

FOR WATER GAUGES

Fig. 587

Length .... inches	10	11	12	13	14	15	16	17
½-inch outside diameter....per dozen	$3.00	$3.24	$3.60	$3.84	$4.20	$4.44	$4.80	$5.04
⅝-inch outside diameter.... "	3.00	3.24	3.60	3.84	4.20	4.44	4.80	5.04
¾-inch outside diameter.... "	3.60	3.96	4.32	4.80	5.16	5.52	5.88	6.24
Length .... inches	18	19	20	22	24	30	36	48
½-inch outside diameter....per dozen	$5.40	$5.64	$6.00	$6.60	$7.20	$9.00	$10.80	$14.52
⅝-inch outside diameter.... "	5.40	5.64	6.00	6.60	7.20	9.00	10.80	14.52
¾-inch outside diameter.... "	6.60	7.08	7.44	8.16	8.88	11.16	13.44	18.00

½-inch sizes one dozen in a package; other sizes half dozen in a package.
Sizes over 24 inches long, at special discount.

Chesterton's Gauge Glass Cutters

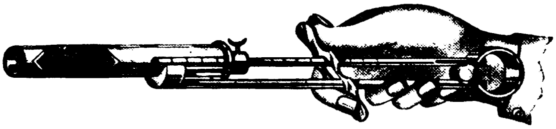
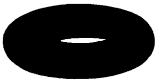


Fig. 588

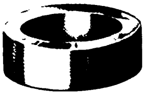
Nickel plated.......	each	$2.00
Extra cutter wheels.......	"	.15

Rubber Gauge Glass Washers



Round
Fig. 589

Size .... inches	½	⅝	¾
Round .... per dozen	$0.25	$0.25	$0.35
Square .... "	.25	.25	.35



Square
Fig. 590

Gilbert's Gauge Glass Preservers

SELF-PACKING

Size .... inches	½	⅝	¾
Per box containing one dozen........	$0.60	$0.60	$0.60

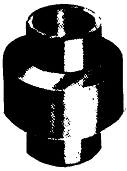
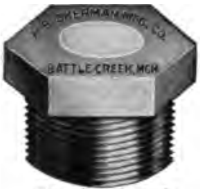


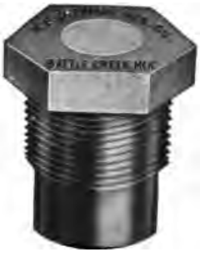
Fig. 591



Regular Length
Fig. 592

Fusible Plugs

FOR OUTSIDE INSERTION



Extra Long
Fig. 593

These plugs are filled with Banca tin and bear imprint as shown on cuts, and meet in every respect the requirements of the U. S. Government and steamboat inspection bureaus.

All plugs should be inserted so that the small end of the Banca tin shall be exposed to the fire.

Size .... inches	½	¾	1
Regular length....... each	$0.60	$0.75	$1.00
Extra long .... "	1.20	1.50	2.00

Elliptic Flue Scrapers

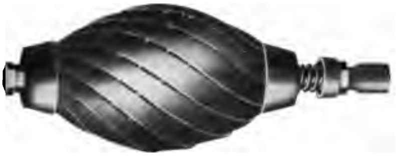


Fig. 594

Outside diameter of tube.....inches	1½	2	2¼	2½	3	3½	4
Price.....each	$2.00	2.00	2.25	2.50	3.00	3.50	4.00

Engineers' Favorite Flue Scrapers

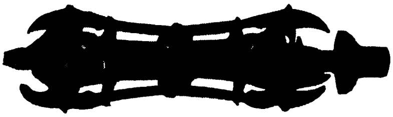
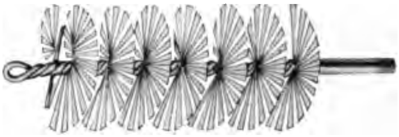


Fig. 595

Spiral Flue Brushes



Flat Steel Wire
Fig. 596

Outside diameter of tube.....inches	2	2½	3	3½	4
Engineers' Favorite.....each	$2.00	2.50	3.00	3.50	4.00
Spiral flat steel wire brushes..... "	2.00	2.50	3.00	3.50	4.00

"Magic" Flue Blowers

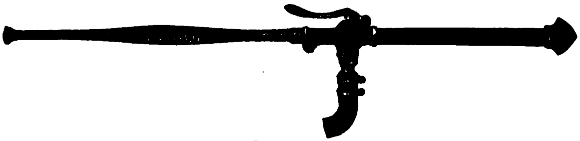


Fig. 597

Number.....	1	2	3	4	5	6
Outside diameter of tube.....inches	2 to 2¼	2½ to 2¾	3 to 3¼	3½ to 3¾	4 to 4½	5 to 6
Price.....each	$5.00	6.25	7.50	8.75	10.00	12.50

The above prices do not include hose.

Standard Roller Tube Expanders

DUDGEON TYPE

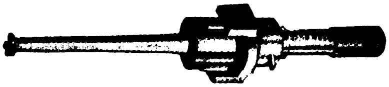


Fig. 598

This expander has a solid body, thus avoiding constant breaking of cap screws. It is made from the best material and with great care. One expander will answer for any thickness of tube sheet.

Outside diameter of tube.....inches	2	2¼	2½	3	3½	4
Complete.....each	$10.00	12.00	14.00	18.00	23.00	30.00
Extra mandrels..... "	2.50	3.00	3.50	4.00	5.00	6.50
Extra rolls (set of 3).....set	1.00	1.15	1.30	1.60	2.00	2.50

Penberthy Automatic Injectors

TO START

Open full the globe valve in water supply first, and then globe valve in steam pipe.

If water issues from overflow, throttle the water supply valve until discharge stops.

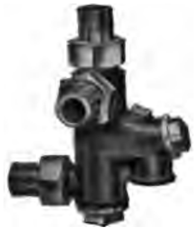


Fig. 599

SUCTION LEFT—OVERFLOW FRONT—DISCHARGE BACK

TO STOP

Close the steam valve. The water valve need not be closed unless the injector is used as a non-lifter, or lift is considerable.

Size Number	Price, Each	Horse Power Based on Ordinary Tub. Boiler	Horse Power Based on 30 lbs. Water per H. P. per Hour	Pipe Connections, Inches	Capacity per Hour, 1 to 3 feet lift, 60 to 110 lbs. Steam Pressure		Shipping Weight, Boxed
					Maximum	Minimum	
					Gallons	Gallons	lbs. oz.
O	$15.00	3 to 6	4 to 8	¼	60	35	2—5
OO	16.00	4 " 8	6 " 12	⅜	80	45	2—9
A	18.00	8 " 16	10 " 20	½	135	70	3—8
AA	20.00	12 " 22	15 " 30	½	180	100	3—8
B	25.00	17 " 32	22 " 45	¾	260	140	5—6
BB	30.00	20 " 45	25 " 60	¾	360	180	5—6
C	40.00	40 " 65	45 " 80	1	475	250	8—0
CC	45.00	45 " 80	50 " 100	1	600	325	8—0
D	55.00	50 " 100	60 " 135	1¼	800	425	12—0
DD	60.00	75 " 135	85 " 165	1¼	1,000	525	12—0
E	75.00	100 " 180	125 " 235	1½	1,400	740	25—0
EE	90.00	115 " 255	150 " 320	1½	1,900	850	25—0
F	110.00	160 " 320	200 " 400	2	2,400	1,275	37—9
FF	125.00	200 " 400	250 " 500	2	3,000	1,600	39—0
G	150.00	300 " 500	325 " 600	2½	3,600	1,875	75—0
GG	200.00	375 " 600	400 " 750	2½	4,200	2,150	75—0

When ordering injectors by size connections, we will always send the size having the larger capacity. Order by letter as in the first column.

PRICE LIST OF PARTS OR REPAIRS

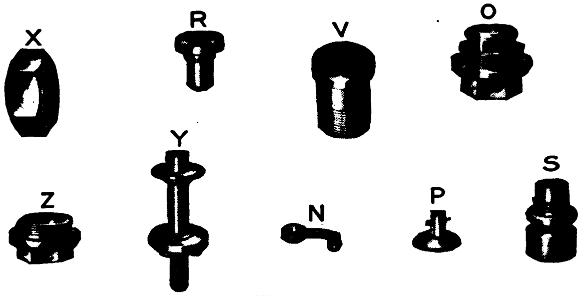


Fig. 600

In ordering injector parts do not fail to mention the serial number and letter, which will be found on top of the overflow, otherwise we must write you for this information, and thus delay shipment.

In referring to or ordering parts, call them by letter or name as in the cut or table.

Size Number.........	O or OO	A or AA	B or BB	C or CC	D or DD	E	EE	F	FF	G or GG
R—Steam Jet....each	$0.25	$0.35	$0.45	$0.55	$0.65	$0.75	$0.75	$0.85	$1.00	$2.00
S—Suction Jet.... "	.25	.35	.45	.55	.65	.75	.75	.85	1.00	3.00
Y—Delivery Jet.. "	1.25	1.50	2.00	2.50	3.00	3.75	4.50	5.50	6.50	9.00
X—Coupling Nut.. "	.25	.30	.40	.50	.60	1.25	1.25	1.50	1.50	2.00.
V—Tail Pipe..... "	.25	.30	.40	.50	.60	.80	.80	1.00	1.00	1.25
Z—Overflow Cap.. "	.30	.40	.50	.60	.70	.80	.80	.90	.90	1.50
P—Overflow Valve "	.40	.50	.60	.75	.90	1.00	1.10	1.25	1.25	1.75
N—Overflow Hinge "	.10	.10	.15	.15	.15	.20	.20	.20	.20	.30
O—Plug.......... "	.60	.80	1.00	1.25	1.50	1.75	1.75	2.00	2.00	4.00
Strainer...... "	.40	.45	.50	.55	.60	.75	.75	1.00	1.00	1.50

Penberthy
"XL-96" Improved Ejectors, Siphon or Steam Jet Pumps

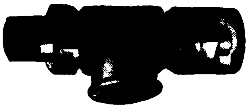


Fig. 601

LIFTS 22 TO 25 FEET. ELEVATES 25 TO 100 FEET 30 TO 100 LBS. PRESSURE.

Size Number	Price All Brass, Each	Price Iron Body Brass Jets, Each	Pipe Connections		Capacity per Hour				Vertical Lift	
			Steam, Inches	Suction and Delivery, Inches	40 to 65 Pounds Steam 3-Foot Lift, Gallons	20 to 40 Pounds or 65 to 100 Pounds, Gallons	40 to 65 Pounds 50 Feet Elevation, Gallons	40 to 65 Pounds 25 Feet Elevation, Gallons	40 to 75 Pounds Steam, Feet	25 to 40 or 75 to 100 Lbs., Feet
1	$ 8.00	Sizes 1 to 4 Made in All Brass Only	⅜	½	240	235	120	180	23	20
2	10.00		½	¾	500	450	250	375	25	22
3	15.00		¾	1	840	700	420	625	25	22
4	20.00		1	1¼	1350	1300	650	950	25	22
5	25.00	20.00	1	1½	1950	1850	975	1450	25	22
6	35.00	27.50	1¼	2	3500	3000	1750	2600	25	22
*7	50.00	40.00	1½	2½	5700	4350	2500	3750	25	22
*8	70.00	50.00	2	3	9500	8160	4750	7200	25	22
*9	105.00	70.00	2	3½	13600	12400	6800	10200	25	22
*10	145.00	95.00	2½	4	18400	17100	9200	13800	25	22

When ordering ejectors specify size number.

Sizes 5 and 6 will be sent in all brass unless ordered with iron body and brass jets and steam connection.

*Unless ordered in brass, sizes 7 to 10 inclusive, will be shipped with iron body, brass jets and steam connection.

In ordering by size of connection specify suction and discharge, not steam connection.

PRICE LIST OF PARTS OR REPAIRS

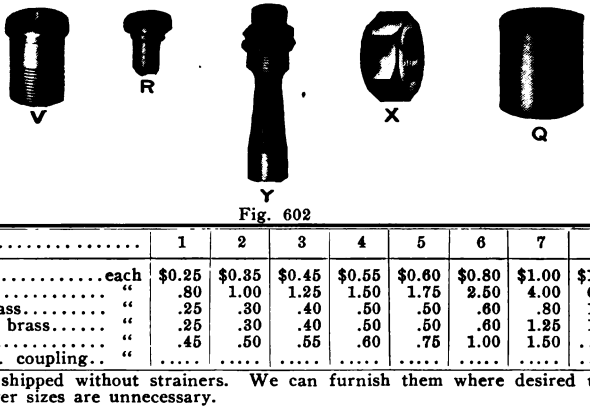


Fig. 602

Size Number		1	2	3	4	5	6	7	8	9	10
R—Steam jet	each	$0.25	$0.35	$0.45	$0.55	$0.60	$0.80	$1.00	$1.25	$1.50	$2.00
Y—Delivery jet	"	.80	1.00	1.25	1.50	1.75	2.50	4.00	6.00	8.00	10.00
V—Tail pipe, brass	"	.25	.30	.40	.50	.50	.60	.80	1.00	1.00	1.25
X—Coupling nut, brass	"	.25	.30	.40	.50	.50	.60	1.25	1.50	1.50	2.00
Strainer	"	.45	.50	.55	.60	.75	1.00	1.50	.....	.....	.....
Q—Regular I. P. coupling..	"	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Ejectors are shipped without strainers. We can furnish them where desired up to Number 7. Strainers for larger sizes are unnecessary.

Jarecki Steam Jet Pumps

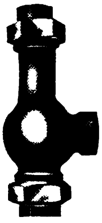


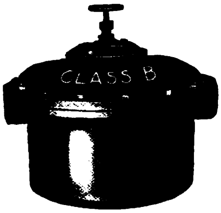
Fig. 603

Size of Pump, Inches	Iron, Each	Suction Pipe, Inches	**Discharge Pipe, Inches**	Steam Pipe, Inches	Gallons per Minute
1	$5.00	1	¾	½	15
1¼	8.00	1¼	1	½	20
1½	10.00	1½	1¼	¾	30
2	14.00	2	1½	¾	40
2½	18.00	2½	2	1	50
3	22.00	3	2½	1	60

Nason Steam Traps

The function of these traps is to receive and automatically discharge the condensation from heating surfaces of every description without loss of pressure or waste of steam.

"CLASS B"



"Class B"
Fig. 604

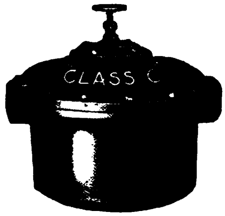
These steam traps are designed for low pressure conditions usually found in steam heating plants.

The area of the discharge valve is enlarged to permit the rapid discharge of water under the low pressures for which it is designed.

This type should be specified where pressures are
BETWEEN 1 AND 20 POUNDS

Size Number	1	2	3	4	5
Size pipe connection..........inches	½	¾	1	1¼	1½
Weight each ....pounds	40	80	113	176	336
Price ....each	$16.00	20.00	27.50	42.50	70.00

"CLASS C"



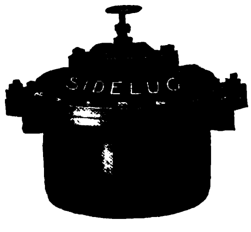
"Class C"
Fig. 605

These steam traps are designed for standard service conditions, where the working steam pressure does not exceed 70 pounds.

The area of the discharge valve is reduced to suit the pressure conditions for which it is designed, and this type should be specified where pressures are
BETWEEN 20 AND 70 POUNDS

Size Number	1	2	3	4	5
Size pipe connection..........inches	½	¾	1	1¼	1½
Weight each ....pounds	40	80	113	176	336
Price ....each	$16.00	20.00	27.50	42.50	70.00

"SIDELUG"



"Sidelug"
Fig. 606

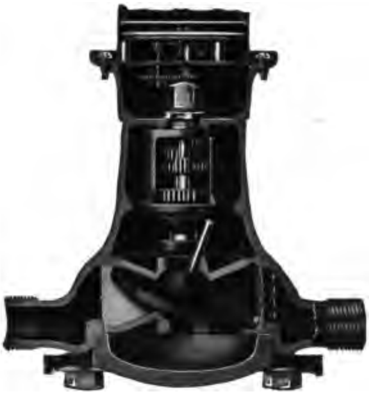
These steam traps present the same principle as types "Class B and C," but are designed for higher pressures. A feature of this style trap is the reinforcing lugs cast over the inlet and outlet, where the steam ports pass from pot to cover, so that leakage at or near these points cannot occur through the blowing out of the flange gasket. The castings are heavier throughout, with a considerable increase in the size and number of bolts, and this type should be specified where pressures are
BETWEEN 40 AND 150 POUNDS

Size Number	1	2	3	4	5
Size pipe connection..........inches	½	¾	1	1¼	1½
Weight each ....pounds	47	92	125	212	343
Price ....each	$16.85	21.30	29.25	45.50	74.75

TABLE OF DIMENSIONS AND CAPACITIES

Size Number	1	2	3	4	5
Size pipe connections ....inches	½	¾	1	1¼	1½
Outside diameter of flanges.......................inches	10¾	14¼	15¾	19	24¼
Diameter of cylinder.............................inches	8	10½	12	14	18
Height to top of valve ....inches	11	14	16¼	18½	23½
Height to top of cover ....inches	8	10	12	14	15½
Nominal discharge pounds water per minute.............	4½	6½	10	15½	23
Nominal square feet of surface.........................	500	1150	1750	2550	4000
Nominal lineal feet of 1-inch pipe......................	1500	3450	5250	7650	12000

Trident Water Meters



Sectional View
Trident Disk Breakable
Bottom Meter
Fig. 607

The Trident Disk Breakable Bottom Meters are of the disk piston type, acknowledged the most simple, efficient and reliable for house or other small service requirements.

For locations free from frost we recommend the Trident Split Case Disk Meter which is of exactly the same construction as the Trident Breakable Bottom Meter with the exception of the main casing, which is entirely of bronze in two parts, held together by four bronze cap screws, rendering the entire mechanism accessible without taking the meter out of the line.

The Trident Crest Meters are especially designed for heavy duty in connection with primary mains, railroad stand pipes, hydraulic elevators or any service requiring the rapid delivery of large quantities of water. This type of meter is commonly known as the "current meter."

The Trident Compound Meters are a combination of the disk and crest types and are so constructed that the very smallest streams are measured through a small disk meter and the large streams through a crest meter. All parts are in one casting, and when the flow is sufficiently large to be recorded by the crest meter the small disk meter is automatically shut off.

There are two registers on the meter which must be added together to determine the amount of water passed.

TRIDENT DISK METERS

Size, Inches	Weight, Pounds	Length, Inches	Diameter, Inches	Height, Inches	Safe Maximum Delivery, Gallons per Minute	Price Breakable Bottom, Each	Price* Split Case, Each	Price Connections, per Set
⅝	12½	7½	5½	8	20	$ 8.00	$8.00	$0.40
¾	15	8⅝	5⅞	8⅜	35	12.00	.....	.60
1	26	10½	9½	9⅛	65	16.00	16.00	.80
1½	50	12⅝	10	10 5/16	100	35.00	.....	.....
2	75	15¼	12 3/16	11⅜	165	55.00	.....	.....
3	330	23¾	20	22½	300	85.00	.....	.....
4	555	29	24½	27	600	175.00	.....	.....

*Trident Split Case Disk Meters are made in ⅝-inch and 1-inch sizes only.
The ⅝-inch size can be furnished with either ½-inch or ¾-inch pipe connections.

TRIDENT CREST METERS

Size, Inches	Weight, Pounds	Length, Inches	Diameter, Inches	Height, Inches	Safe Maximum Delivery, Gallons per Minute	Price, Each
1½	67	12⅝	9	15¼	140	$30.00
2	73	15¼	9½	16	250	40.00
3	267	24	17½	25⅜	550	80.00
4	270	24	17½	25⅜	1000	160.00
6	332	24	18½	26⅞	2200	350.00

Prices on Trident Compound Meters upon application.

Little Giant Natural Gas Regulators

FOR HOUSE SERVICE

Size Number	1	2
Size inlet and outlet........inches	1	1¼
Weight ....pounds	16	26
With automatic valve.........each	$8.00	......
Without automatic valve......each	.....	$10.00

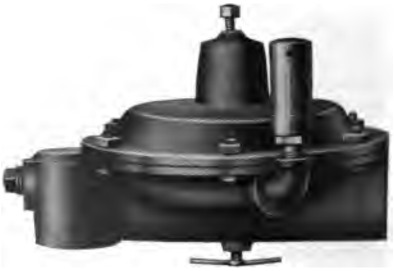
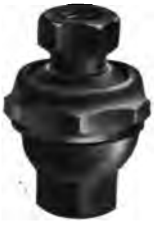


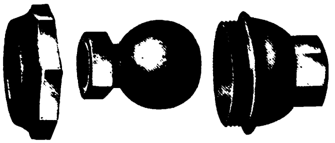
Fig. 608

Moran Flexible Joints

The uses of the Moran Flexible Joints cover almost every conceivable purpose requiring a flexible conveyor of steam, air, gas or liquids under any desired pressure or conditions.

Only three parts, all metal. No gasket or packing to be renewed. Positively tight under all pressures.


No. 1—Fig. 609


Ring Ball Bell
Fig. 610

FOR STEAM, AIR AND GAS
No. 1—STRAIGHT
FOR WORKING PRESSURES UP TO 200 POUNDS

Size .... inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price .... each	$3.00	3.00	3.25	3.75	4.25	5.25	6.00	7.50	9.00	11.25

FOR STEAM, AIR AND GAS
No. 2—ANGLE
FOR WORKING PRESSURES UP TO 200 POUNDS

Size ....inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price .....each	$3.25	3.25	3.50	4.00	4.50	5.50	6.25	8.75	10.50	12.25

No. 2—Fig. 611

No. 3—Fig. 612

No. 3—LIQUID
FOR WORKING PRESSURES UP TO 200 POUNDS

Size ......inches	¼	⅜	½	¾	1	1¼	1½	2
Price ....each	$3.00	3.00	3.25	3.75	4.25	5.25	6.00	7.50
Size ......inches	2½	3	3½	4	4½	5	6	.....
Price ....each	$9.00	11.25	14.00	15.00	18.75	18.75	25.00	.....

Laundry Mangle Joints

Particularly adapted for carrying steam under pressure into revolving metal cylinders, such as pulp machines, laundry mangles, calender rolls in finishing paper, and in various other machines used for special purposes.

Size 1¼x¾-inches.................each $5.00

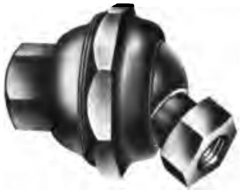


Fig. 613

Moran Automatic Barrel Fillers

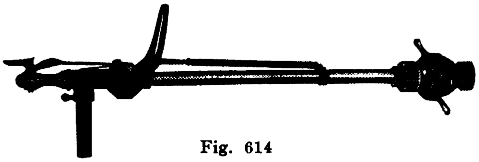


Fig. 614

The joints furnished with these fillers are interchangeable. The filler with ball and ring may be detached and applied to any storage tank or pipe line that is supplied with an extra bell.

Size, Inches	Price, Filler Complete	Price, Extra Ball	Price, Extra Bell	Price, Extra Ring
1½	$25.00	$2.50	$2.25	$1.25
2	30.00	3.00	2.50	2.00

Lubricators

Oil Cups

Grease Cups

Oilers

Fillers

Tallow Pots

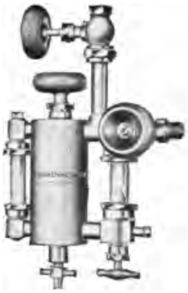
Hydrometers

Hydrometer Jars

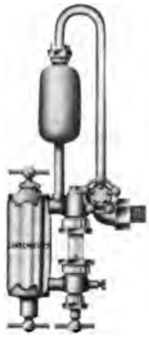
Thermometers

Pages 254 to 262 Inclusive

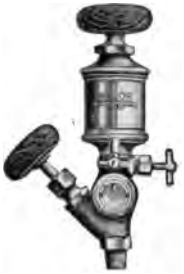
Lunkenheimer Sight-Feed Lubricators



Improved "Senior"
Fig. 615



"Junior"
Fig. 616



"Major"
Fig. 617

IMPROVED "SENIOR" SIGHT-FEED LUBRICATORS

DOUBLE CONNECTION

Size	¼ pint	⅓ pint	½ pint	⅔ pint	1 pint	1½ pint	1 quart
Suitable for engine cylinders	Up to 4 inches	4 to 6 inches	6 to 10 inches	10 to 14 inches	14 to 18 inches	18 to 24 inches	24 to 30 inches
Shank pipe thread, inch	⅜	⅜	⅜	½	½	½	½
Finished brass, each	$12.00	15.00	17.00	20.00	22.00	25.00	28.00
Sight-feed glasses, "	.90	.90	.90	.90	.90	1.20	1.20
Indicator glasses, "	.90	.90	.90	.90	.90	1.20	1.20

"JUNIOR" SIGHT-FEED LUBRICATORS

SINGLE CONNECTION

Size, pint	¼	⅓	½
Shank pipe thread, inch	⅜	⅜	½
Partly finished, each	$7.00	8.00	10.00

"MAJOR" SIGHT-FEED LUBRICATORS

Size Number	1	2	3	4	5	6
Diameter of oil chamber, inches	1⅞	2	2¼	2½	3	3⅜
Capacity, ounces	1½	2½	4	5	10	18
Shank pipe thread, inch	⅜	½	½	½	½	¾
Brass, each	$4.00	5.00	6.00	8.00	10.00	12.00
Extra sight-feed glasses, per dozen	$1.20	1.20	1.20	1.20	1.20	1.20

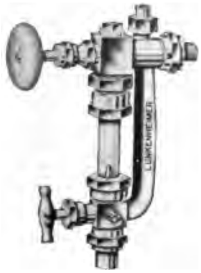


Fig. 618

"INDEPENDENT" SIGHT-FEEDS

"Independent" Sight-feeds are intended to be used in connection with closed pressure tank systems for the purpose of supplying oil to steam chests and cylinders of steam engines. This method of lubrication is often used where a number of engines are in close proximity to each other, and the oil for all is supplied from a centrally located tank under pressure.

Plain brass, (without equalizing attachment), each	$6.00

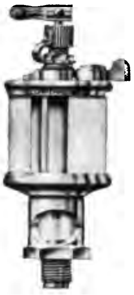


Fig. 619

Lunkenheimer Improved "Paragon" Glass Body Sight-Feed Lubricators

Size Number	Outside Diameter of Glass, Inches	Height of Glass, Inches	Capacity, Ounces	Shank Pipe Thread, Inches	Finished Brass, Each
1½	1¾	1⅝	1½	¼	$2.00
2	2	1⅞	2½	⅜	2.80
3	2¼	2⅛	4	⅜	3.50
4	2½	2⅜	5	⅜	4.00
5	3	3	10	½	5.40
6	3½	4	18	½	7.00

Lunkenheimer Plain Engine Lubricators

Size Number	Diameter, Inches	Capacity, Ounces	Shank Pipe Thread, Inches	Price, Each
1	1½	1¼	⅜	$2.40
2	1¾	1½	½	2.60
3	2	2½	½	2.90
4	2¼	4	½	3.25
5	2½	5	½	3.75
6	3	10	¾	4.75

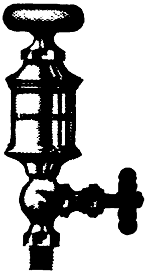


Fig. 620

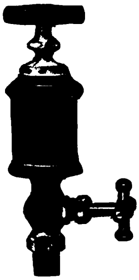


Fig. 621

Plain Lubricators

IRON BODY BRONZED—IRON WHEELS

Diameter of body	inches	2
Shank pipe thread	inches	½
Price	each	$2.25

Two-Quart Engine Lubricators

SIGHT FEED—IRON BODY

FOR LUBRICATING STEAM ENGINES WITH CRUDE OIL
ESPECIALLY DESIGNED FOR DRILLING AND PUMPING ENGINES
FURNISHED COMPLETE WITH STEAM PIPE AS SHOWN

WEIGHT................54 POUNDS

Price, complete ....each $20.00

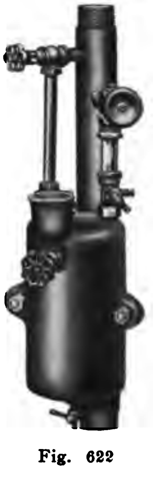
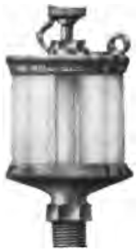
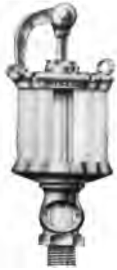
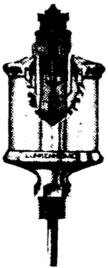


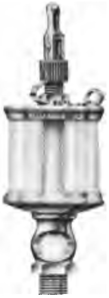
Fig. 622

Lunkenheimer Oil Cups


"Pioneer"
Fig. 623


"Crown"
Fig. 624


"Automatic Rod"
Fig. 625


"Sentinel"
Fig. 626

"PIONEER" SLIDE-TOP GLASS BODY OIL CUPS

This cup is especially adapted for traction engines, steam rollers and other machinery of like character, where it is necessary to use a durable and substantial oiler.

Number	0	1	1 1/2	2	3	4	5
Extreme outside diameter of cup ... inches	1 1/2	1 3/4	2	2 5/16	2 9/16	2 3/4	3 1/4
Extreme height of cup (over all) ... "	3 3/16	3 3/4	4 1/16	4 7/16	4 3/4	5 1/8	6
Outside diameter of glass ... "	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	3
Height of glass ... "	1 1/8	1 3/8	1 5/8	1 7/8	2 1/8	2 3/8	3
Capacity ... ounces	5/8	1	1 1/2	2 1/2	4	5	10
Shank pipe thread ... inches	1/8	1/4	1/4	3/8	3/8	3/8	1/2
Finished brass ... each	$0.80	1.00	1.25	1.50	1.90	2.40	3.10

"CROWN" INDEX SIGHT-FEED GLASS BODY OIL CUPS

A very satisfactory cup for dynamo and engine use, and we recommend it where a first-class substantial cup is wanted.

Number	0	1	1 1/2	2	3	4	5	6	8
Extreme outside diameter of cup (lever included) ... inches	2 5/16	2 11/16	2 15/16	3 1/4	3 3/4	4	4 11/16	5 1/4	6 1/4
Extreme height of cup (over all) ... "	4 1/2	5 3/16	5 5/8	6	6 9/16	7 7/16	8 1/4	9 3/16	10 3/8
Outside diameter of glass ... "	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	3	3 1/2	4 1/4
Height of glass ... "	1 1/8	1 3/8	1 5/8	1 7/8	2 1/8	2 3/8	3	4	5
Capacity ... ounces	5/8	1	1 1/2	2 1/2	4	5	10	18	34
Shank pipe thread ... inches	1/8	1/4	1/4	3/8	3/8	3/8	1/2	1/2	3/4
Finished brass ... each	$1.25	1.50	1.75	2.10	2.55	3.15	3.90	4.80	10.00

AUTOMATIC ROD OIL CUPS

SCREW FEED
FOR ENGINE CRANK PIN BEARINGS

Number	0	1	1 1/2	2	3	4
Extreme outside diameter of cup ... inches	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4
Extreme height of cup (plug raised, open to fill) ... "	3 11/16	4 1/16	4 11/16	5 1/8	5 13/16	6
Outside diameter of glass ... "	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2
Height of glass ... "	1 1/8	1 3/8	1 5/8	1 7/8	2 1/8	2 3/8
Capacity ... ounces	5/8	1	1 1/2	2 1/2	4	5
Shank pipe thread ... inches	1/8	1/4	1/4	3/8	3/8	3/8
Finished brass ... each	$1.10	1.50	2.00	2.50	3.00	4.00

"SENTINEL" SNAP LEVER SIGHT-FEED GLASS BODY OIL CUPS

STRAIGHT SHANK

Number	0	1	1 1/2	2	3	4	5
Extreme outside diameter of cup ... inches	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3 1/4
Extreme height of cup (over all, lever up) ... "	5 1/4	5 5/8	5 15/16	6 1/4	6 15/16	7 5/8	8 1/2
Outside diameter of glass ... "	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	3
Height of glass ... "	1 1/8	1 3/8	1 5/8	1 7/8	2 1/8	2 3/8	3
Capacity ... ounces	5/8	1	1 1/2	2 1/2	4	5	10
Shank pipe thread ... inches	1/8	1/4	1/4	3/8	3/8	3/8	1/2
Finished brass ... each	$3.00	3.25	3.50	3.75	4.25	5.25	7.25

Fig. 627

Cylindrical Oil Cup Glasses

These glasses are clear, strong and uniform in size.

Number	0	1	1½	2	3	4	5	6
Outside diameter of glass.............inches	1¼	1½	1¾	2	2¼	2½	3	3½
Height of glass........................ "	1⅛	1⅜	1⅝	1⅞	2⅛	2⅜	3	4
Price ....each	$0.08	.10	.10	.12	.15	.25	.35	.65
Cork washers ....per dozen	$0.24	.30	.36	.40	.45	.50	.60	.75

Lunkenheimer Plain Brass Oil Cups

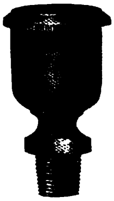


Fig. 628

Number	0	1	2	3	4
Outside diameter ....inches	25/32	⅞	1 1/16	1¼	1 15/32
Shank pipe thread...................... "	⅛	⅛	¼	¼	⅜
Plain finished brass ....each	$0.30	.35	.40	.60	.90

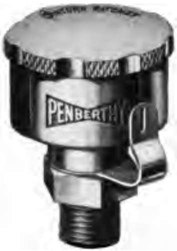


Fig. 629

"Saturn" Ratchet Brass Grease Cups

The cap of these cups is locked to the body or shank. The caps can only be screwed in or out by overforcing the spring tension and it is impossible for the cap to change its relative position to the body of cup merely by vibration.

Number	000	00	0	½	1	2
Diameter of body..................................inches	13/16	1 1/32	1¼	1 7/16	1 9/16	1 15/16
Extreme outside diameter (over all).................. "	15/16	1 5/32	1⅜	1 9/16	1 11/16	2 1/16
Extreme height over all (cup open).................. "	1 5/16	1 9/16	1 13/16	2⅛	2½	2⅞
Shank pipe thread .... "	⅛	⅛	¼	¼	¼	⅜
Capacity (grease) ....ounces	¼	½	⅔	1	1⅓	2
Finished brass ....each	$0.70	.85	1.00	1.20	1.50	2.10

"Empress" Plain Compression Steel Grease Cups

These cups are pressed from sheet metal, making them stronger than castings and free from air holes and other defects.

These cups can be furnished on special orders in polished brass, dull brass, nickel-plated brass, blued steel and nickel-plated steel finishes. Prices upon application.

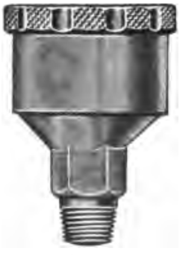
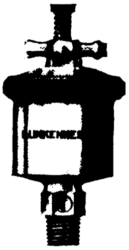
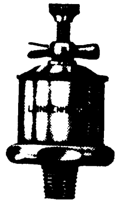


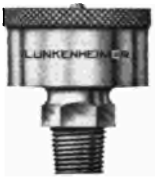
Fig. 630

Number	Inside Diameter, Inches	Shank Pipe Thread, Inches	Capacity Grease, Ounces	Rough Steel Finish, Each
00	1	⅛	½	$0.50
0	1¼	¼	⅔	.65
1	1½	¼	1	.80
2	2	⅜	2	1.05
3	2½	½	3½	1.45
4	3	½	5	2.00

Lunkenheimer Grease Cups


"Ideal"
Fig. 631


"Jewel"
Fig. 632


"Tiger"
Fig. 633

"IDEAL" AUTOMATIC BRASS GREASE CUPS

This is a heavy, highly finished, cast brass, automatic compression cup, suitable for bearings of all kinds.

Number	00	0	1	2	3
Inside diameter ... inches	7/8	1 1/4	1 1/2	2	2 1/2
Extreme outside diameter ... "	1 3/8	1 3/4	2	2 5/8	3 1/4
Extreme height over all (plunger raised) ... "	3 1/4	4 5/8	5 1/4	6 1/2	7 1/2
Shank pipe thread ... "	1/8	1/4	1/4	3/8	1/2
Capacity (grease) ... ounces	1/3	1	1 1/2	3	6
Finished brass ... each	$1.50	2.00	2.50	3.20	4.30

"JEWEL" AUTOMATIC BRASS GREASE CUPS

A cup designed to meet the demand for a simple and inexpensive brass automatic cup. The base is made of cast brass and the top of tubing and spun brass. It is well made and its lightness makes it suitable for use on rapidly moving bearings.

Number	00	0	1	2	3	4
Inside diameter ... inches	1	1 1/4	1 1/2	2	2 1/2	3
Extreme outside diameter ... "	1 3/8	1 3/4	2	2 17/32	3 1/8	3 5/8
Extreme height over all (plunger raised) ... "	3 1/8	3 13/16	4 3/8	5 5/8	6 7/8	8 1/16
Shank pipe thread ... "	1/8	1/4	1/4	3/8	1/2	1/2
Capacity (grease) ... ounces	1/3	1	1 1/2	3	6	10
Finished brass ... each	$0.80	1.00	1.30	1.70	2.30	3.20

"TIGER" PLAIN BRASS GREASE CUPS

A cast brass cup, well adapted for jarring machinery, and is unsurpassed where a simple, compact and efficient plain cup is required.

Number	00	0	1	2	3	4
Inside diameter ... inches	7/8	1 7/32	1 3/8	1 7/8	2 3/8	2 7/8
Extreme outside diameter ... "	1 1/8	1 15/32	1 21/32	2 5/32	2 21/32	3 5/32
Extreme height over all (cup open) ... "	1 5/8	1 7/8	2 1/8	2 11/32	2 11/16	2 29/32
Shank pipe thread ... "	1/8	1/4	1/4	3/8	1/2	1/2
Capacity (grease) ... ounces	1/2	2/3	1	2	3 1/2	5
Finished brass ... each	$0.70	.90	1.15	1.50	2.15	3.30

Powell Patent
"Bruno" All-Iron Compression Grease Cups

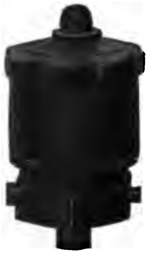


Fig. 634

This cup is especially adapted for use on friction clutch pulleys, cement mills, clay machinery, link-belt machinery and journals of all kinds where special finish is not required.

Number	00	0	1	2	3
Inside diameter ... inches	1	1 1/4	1 1/2	2	2 1/2
Shank pipe thread ... "	1/4	1/4	3/8	3/8	1/2
Capacity (grease) ... ounces	1/3	1	1 1/2	3	4 1/2
Painted ... per dozen	$10.00	11.25	12.00	12.50	25.00

Zinc Oilers

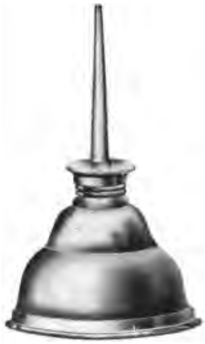


Fig. 635

CHACE'S PATTERN

Seamless body, double seamed spring tin bottoms. Spun screw with coarse thread. Spout runs clear through screw, preventing it from being easily broken. Large opening for easy filling.

Size Number..................	1	2	3	4	5	6
Capacity ....pints	⅛	¼	⅜	½	¾	⅞
Diameter at bottom......inches	2¾	3¼	3¾	4⅛	4½	4¾
Height over all..........inches	4⅜	7	7½	8¼	9	9½
Price................per dozen	$1.50	2.00	2.25	2.75	3.50	4.50

Copper Plated Steel Oilers

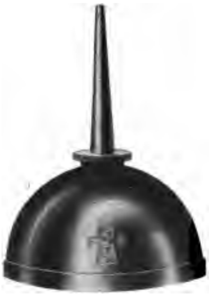


Fig. 636

Made from No. 20 gauge cold-rolled steel. Heavily copper plated inside to prevent rusting. Outside polished copper. Tempered spring steel bottoms. Reinforced spouts fitted with leather washers.

Size Number..........	12	13	14	15	16
Capacity ....pints	⅛	¼	¼	⅞	⅞
Diameter at bottom..in.	2¾	3⅜	3⅜	4¼	4¼
Length of spout.....in.	2½	3	9	3	9
Price.........per dozen	$4.50	5.50	6.50	9.25	10.50

Nos. 14 and 16 have bent spouts, the balance have straight spouts. All spouts are interchangeable.

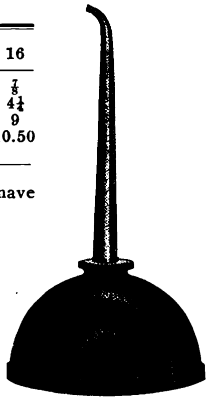


Fig. 637

Steel Railroad Oilers

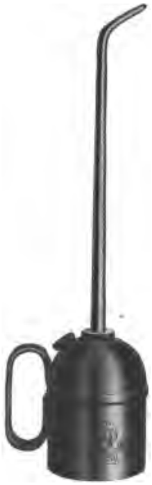


Fig. 638

COPPER PLATED

Seamless coppered steel body. Reinforced spout with union connection, enabling it to be turned in any direction desired for delivering the oil.

Size Number	Capacity	Diameter at Bottom, Inches	Length of Spout, Inches	Height Over All, Inches	Price, Per Dozen
10	1-Pint	3⅜	12	17	$14.00
11	1-Quart	4⅛	18	24	18.00

The Cannon Oilers

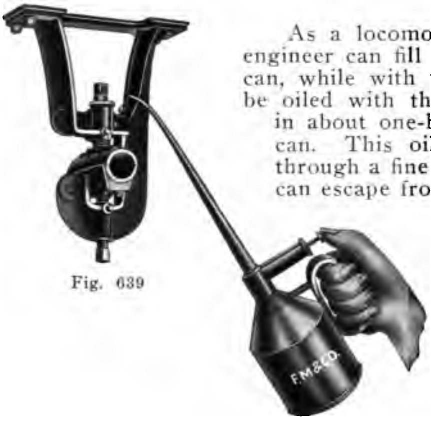


Fig. 639

As a locomotive oiler the Cannon has no equal. The engineer can fill the cups as quickly as with a large nozzle can, while with the Cannon all the smaller machinery can be oiled with the same oiler without wasting a drop and in about one-half the time it takes with the ordinary oil can. This oiler cannot stop up, as all the oil passes through a fine strainer before reaching the spout. No oil can escape from the can when inverted unless the plunger is pressed.

Size Number	Capacity	Diameter, Inches	Extreme Height, Inches	Length Spout, Inches	Kind	Price, Each	Price, Per Dozen
0	1 Pt.	3½	9¼	6	Tin	$0.85	$10.00
1	1 Pt.	3	12½	8	"	0.85	10.00
2	1½ Pt.	3½	17¼	12	"	0.95	11.00
3	1 Qt.	4	26	20	"	1.10	13.00
0	1 Pt.	3½	9¼	6	Brass	1.35	16.00
1	1 Pt.	3	12½	8	"	1.35	16.00
2	1½ Pt.	3½	17¼	12	"	1.50	18.00
3	1 Qt.	4	26	20	"	1.75	21.00

Zinc Oil Fillers

Seamless body. Soldered spring bottom. Spun screw with large opening for easy filling.

Size Number	733	734	735
Capacity .... pints	1	1½	2
Diameter at bottom .... inches	4¾	5¼	6
Height .... inches	4¼	4¾	5¼
Price .... per dozen	$4.00	5.00	6.00

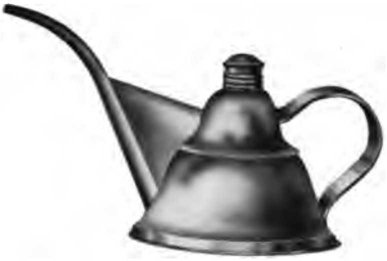


Fig. 640

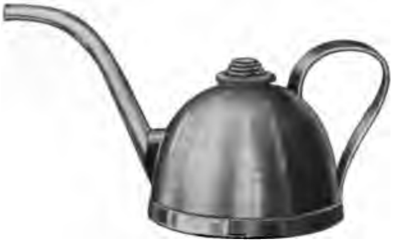


Fig. 641

Engineers' Steel Fillers

COPPER PLATED

Seamless cold-rolled steel body. Soldered spring bottom. Screw top. Flat handle.

Size Number	Capacity	Diameter at Bottom, Inches	Height, Inches	Price, Per Dozen
210	1-Quart	5	5	$20.00
211	2-Quart	6	6	24.00

Steel Tallow Pots

COPPER PLATED

Seamless cold-rolled steel body. Screw cap attached to handle with chain.

Size Number	Capacity	Diameter at Bottom, Inches	Height, Inches	Price, Per Dozen
212	1-Quart	5	5	$21.00
213	2-Quart	6	6	25.00

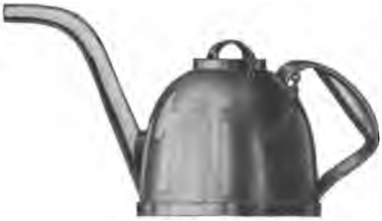
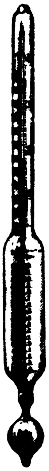
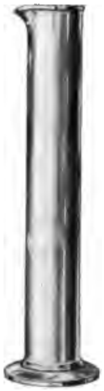


Fig. 642

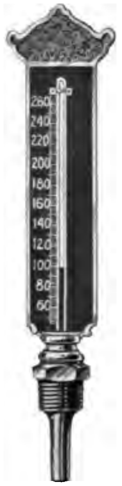
Hydrometers, Hydrometer Jars and Thermometers



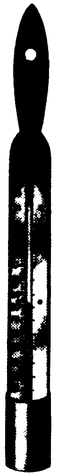
Hydrometer Combined with Thermometer
Fig. 643



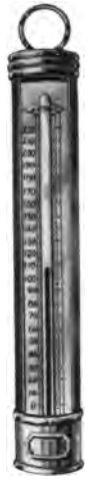
Hydrometer Jar
Fig. 644



Mechanical Thermometer Straight Stem
Fig. 645



Oil Thermometer Wood Case
Fig. 646



Japanned Tin Case Thermometer
Fig. 647

HYDROMETERS COMBINED WITH THERMOMETERS

Size Number	Range, Degrees	Graduated in Beaume Degrees	Length, Inches	Price, Each
4115	10 to 40	½	10	$2.00
4116	30 to 60	½	10	2.00
4117	50 to 90	½	10	2.00
4118	10 to 90	1	12	2.00

HYDROMETER JARS

Size ....inches	1x5	1x6	1½x8	1½x10	1½x12	2x12	2x15	2½x15	2x18	3x18
Price ....each	$0.15	.20	.30	.35	.40	.45	.55	.70	.85	1.20

MECHANICAL THERMOMETERS

Iron nickel-plated case, brass oxidized scales, white filled figures, ½-inch iron pipe thread.

For gasoline engines—straight stem, graduated 50° to 650° Fahrenheit. Length, 11½-inches	each	$3.00
For gasoline engines—angle stem, graduated 50° to 650° Fahrenheit. Length of case, 8½-inches	each	3.50
For hot water—straight stem, graduated 60° to 260° Fahrenheit. Length, 11½-inches	each	3.00
For hot water—angle stem, graduated 60° to 260° Fahrenheit. Length of case, 8½-inches	each	3.50

OIL THERMOMETERS—WOOD CASE

12-inch Wood Case Oil Thermometers, with brass cup fitted at bottom to retain liquid while making observations. Scaled 10° to 140° Fahrenheit in 2° divisions	per dozen	$16.50

JAPANNED TIN CASE THERMOMETERS

10-inch Japanned Tin Case Thermometers, scaled 0° to 220° Fahrenheit in 2° divisions	per dozen	$10.50
10-inch Japanned Tin Case Thermometers, scaled 50° to 300° Fahrenheit in 2° divisions	per dozen	12.00

Barrett Jacks

Geared Ratchet Screw Jacks

Hydraulic Jacks

Jack Screws

Chain Hoists

Trolleys

Wood Blocks

Hollow Steel Blocks

Wrought Iron Blocks

Producers' Snatch Blocks

Iron Sheaves

Pages 263 to 284 Inclusive

The Construction of the "Barrett" Jacks

The Barrett Jack combines all the qualities recommended by the Committee on Track Jacks of the Roadmasters' Association, and was specifically endorsed by them.

The movements are easy and positive; the materials used in its construction are the best obtainable.

All Barrett Jacks are constructed of the following materials:

Frame or Base—Malleable Iron.
Rack—Forged Steel, Machine Cut Teeth.
Pawls—Drop Forged Open Hearth Steel of High Carbon.
Fulcrum Pin—High Carbon Rolled Steel, Machined.
Bearings—Hardened Steel.
Handles—Selected Ash or Hickory.

The large rectangular shaped base gives great lifting strength, and permits the Jack to be used in close quarters, affording an advantage over round or bulky bases.

The ribs of the base combine great strength with comparatively light weight.

These Jacks are adapted to high or low set loads by using either the top of the rack or the projecting foot at the lower end.

The working parts are all accurately machine finished, and when worn out can be easily removed and replaced at slight expense.

The Barrett Jack is the best designed, most carefully made, and the safest Jack known to the railroad or industrial world today.

The fact that nearly half a million Barrett Jacks have been placed with American Steam and Street Railways, is sufficient evidence of their worth.

These Jacks can be modified to meet special requirements. We shall be pleased to correspond with anyone in reference thereto.

Barrett Jacks

DOUBLE ACTING TRIP JACKS

These jacks have a compound, double acting lever, and raise the load one-half a notch on both upward and downward strokes. The load can be instantly dropped from any elevation at will of operator. It is positive, speedy and durable.

No. 1 — Track or Trip Jack is the recognized standard track jack and has been adopted by the leading railroads of America. Its construction conforms strictly to the requirements of the Roadmasters' Association and it was specifically recommended by them in their report of September, 1902.

No. 6—Trip Ballast Gang Track Jack is the most powerful and has the greatest raise of any of the double acting trip jacks.

No. 1—Fig. 648

No. 6—Fig. 649

Jack Number	Capacity, Tons	Height, Bar Down, Inches	Raise of Bar, Inches	Height, Bar Raised, Inches	Size of Bar, Inches	Weight with Lever, Pounds	Price, Each
1	10	24	13½	37½	1½x1½	65	$18.00
6	15	31	19	50	1⅞x1⅝	110	32.00

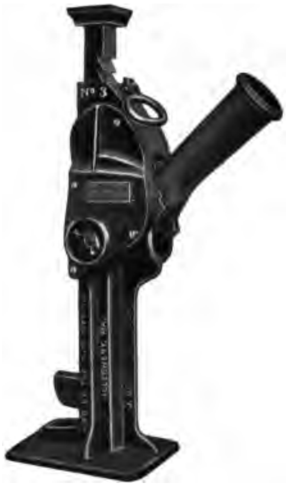
DOUBLE ACTING AUTOMATIC LOWERING JACKS

No. 2—Fig. 650

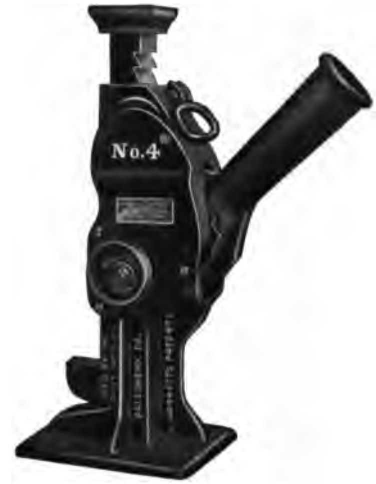
No. 2—Automatic Lowering Jack, is a most popular and useful jack, being suitable for all general lifting purposes. It is the recognized standard for electric street railway lines, being used in track construction, also as a car jack in cases of emergency, such as derailment or accident where cars have to be lifted quickly and lowered gradually. Its operation is easy and simple. The load is moved up or down one-half a notch at each stroke on both upward and downward movements of the lever. The direction is easily controlled by the eccentric at side of the frame. It has no trip, consequently cannot drop a load through carelessness.

Jack Number	Capacity, Tons	Height, Bar Down, Inches	Raise of Bar, Inches	Height, Bar Raised, Inches	Size of Bar, Inches	Weight with Lever, Pounds	Price, Each
2	10	21	10	31	1⅝x1½	73	$25.00

Barrett Jacks



No. 3—Fig. 651

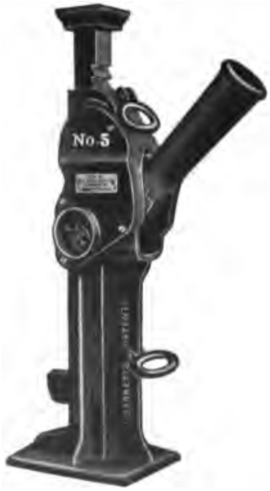


No. 4—Fig. 652

DOUBLE ACTING AUTOMATIC LOWERING JACKS

The load is moved up or down one-half a notch at each stroke on both upward and downward movements of the lever. The direction is easily controlled by the eccentric at side of frame. There is no trip, consequently cannot be dropped. These jacks will operate at any angle.

Jack Number	Capacity, Tons	Height, Bar Down, Inches	Raise of Bar, Inches	Height, Bar Raised, Inches	Size of Bar, Inches	Weight with Lever, Pounds	Price, Each
3	12	26½	15	41½	1¾x1⅞	95	$30.00
4	15	22	10	32	2x2	106	35.00
5	15	28	15	43	2x2	124	40.00



No. 5—Fig. 653

No. 3—Automatic Lowering Jack is frequently employed in lifting heavy machinery, and is designed to grapple low set loads and raise them to full range of lift. For general lifting purposes, this is one of the most substantial, efficient and popular jacks ever designed. Will operate at any angle.

No. 4—Automatic Lowering Jack is one of the most substantial and powerful jacks made and is constructed for heavy service. The frame and lifting bar are unusually heavy, with all working parts in proportion. Will operate at any angle.

No. 5—Automatic Lowering Jack, the same as No. 4, with the exception of the height and length of raise.

Barrett Jacks

No. 50—Fig. 654

No. 51—Fig. 655

DOUBLE ACTING AUTOMATIC LOWERING JACKS

No. 50 Jack—This jack covers a wide field of adaptation and is designed for general lifting purposes. It is particularly adapted to the rapid handling of mining machinery, mine cars, agricultural machinery and light or narrow gauge track. It is also suitable for machine shop work and may, in fact, be readily applied to any load within the range of its capacity. This jack is double acting, light in weight and has a quick, positive action.

No. 51 Jack is the same as No. 50 in all respects, except that it stands 5 inches higher. This size has all the features and covers the same purposes as No. 50, but is designed to meet conditions where a higher range of lift is required.

These jacks operate at any angle.

Jack Number	Capacity, Tons	Height, Bar Down, Inches	Raise of Bar, Inches	Height, Bar Raised, Inches	Size of Bar, Inches	Weight with Lever, Pounds	Price, Each
50	5	16	8	24	1¼x1¼	35	$16.00
51	5	21	13	34	1¼x1¼	42	18.00

No. 8—Fig. 656

Barrett Jacks

DOUBLE ACTING AUTOMATIC LOWERING JACKS

No. 8—This jack is popularly known as a car box or journal jack, and is used principally for raising and lowering trucks so as to admit the easy removal and replacing of journal brasses.

It is double acting, the direction being controlled by the eccentric on side of frame. There is no trip. Will operate at any angle.

This jack is made special with extra length of rack for raising electric cars in removing the trucks.

Jack Number	Capacity, Tons	Height, Bar Down, Inches	Raise of Bar, Inches	Height, Bar Raised, Inches	Size of Bar, Inches	Weight with Lever, Pounds	Price, Each
8	10	11	5	16	1⅝x1½	52	$22.00

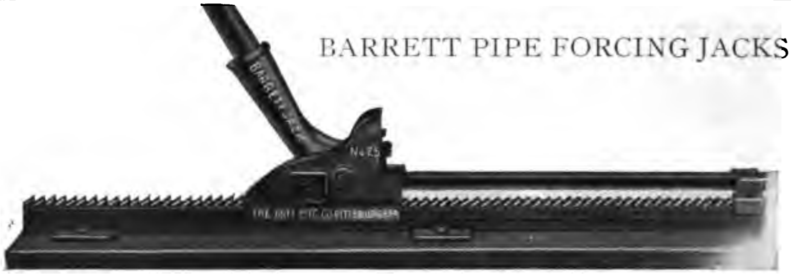


Fig. 657

The Barrett Pipe Forcing Jack represents a special application of the Barrett Jack for forcing pipe horizontally through the ground. It may be used advantageously for forcing pipe under lawns, sidewalks, street crossings, and railway tracks, thereby saving large expense and inconvenience for ditching and replacing.

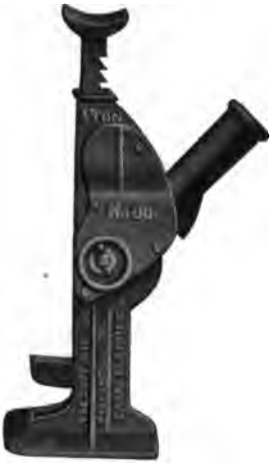
This jack consists of a cage, which travels on a rack, being moved by a socket lever and pawls. At the front of the cage is a groove and clamp for holding pipe from ¾ to 4-inches in diameter. The rack has machine-cut teeth, and is provided with bolts, for bolting to a plank, and also carries two guides for holding pipe in line.

The jack is placed in the ditch and the pipe started in the right direction. When the cage reaches the limit of its travel, it is drawn back to its starting point, and a new section of pipe placed in position. The operation is thus carried on until the desired distance is reached. The front or driving end of the pipe should be provided with a section of pipe one or two feet long, and a size larger than the pipe to be laid. At the front of this section it is best to place a coupling turned to a cutting edge. This will cut its way through all reasonable earth, and remove any sticks or roots the pipe may encounter.

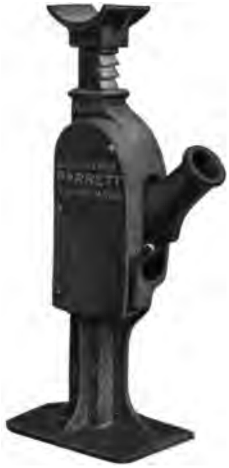
This jack has been thoroughly tested, and has been found that it will pay for itself, in the saving of labor and expense, in a very short time. It is constructed throughout of malleable iron and steel in a substantial manner, and all parts are machine finished. We recommend this jack for forcing sizes of pipe up to 4-inches in diameter.

Jack Number	Capacity, Tons	Total Length, Feet	Travel of Cage, Feet	Weight, Pounds	Price, Each
25	15	8½	7½	185	$40.00

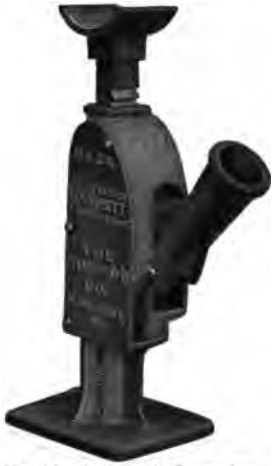
Barrett Automobile Jacks



No. 00
Double Acting
Fig. 658



Nos. 08, 06, and 07—Single Acting
(Patents applied for)
Fig. 659



No. 24—Automatic Lowering Jack—Single Acting
(Patents applied for)
Fig. 660

No. 00 Jack is double acting, raising the load on both the upward and downward strokes of the lever, and lowers the load in the same manner, by simply turning the eccentric at the side. Its height, raise of lifting bar, and curved top are designed to meet automobile requirements, and by means of the foot it can grapple low-set loads with greatest facility. This jack operates at any angle.

No. 08 Jack is single acting, that is, raises on the downward stroke of the lever only. It contains our new reversing lever for controlling the direction, up or down. This improved reversing lever working at the front of the jack, displaces the former eccentric, or thumb screw, at the side of the frame on previous models. This method of reversing the jack is much handier and permits the operator to reverse the jack without reaching through the spokes of the wheel or far under the body of the car to reverse, as previously. The new reversing lever at the front of the jack on these models, may be easily thrown up or down with the jack handle without any inconvenience, or may be thrown up or down without reaching. This feature is found only in the Genuine Barrett Automobile Jacks and patents covering are pending.

No. 06 Jack—Same as No. 08 above described, except that it stands 10-inches high with a raise of 5-inches.

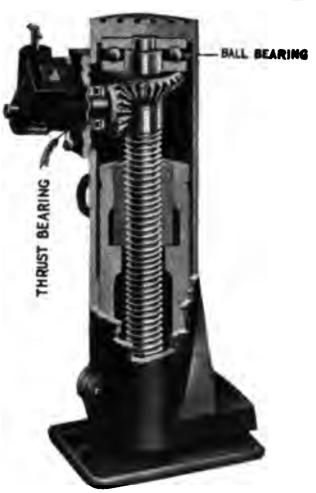
No. 07 Jack—Same as No. 08 above described, except that it stands 8-inches high with a raise of 5-inches.

No. 24 Motor Truck Jack is heavier than the regular automobile sizes, and was designed for the rapid and safe handling of commercial trucks and vehicles. It has a capacity of 2½ tons, and is extremely popular for this work, as it is convenient, and light in weight. It is equipped with improved reversing lever at the front of the jack which may be easily thrown up or down to raise or lower the jack at the will of the operator.

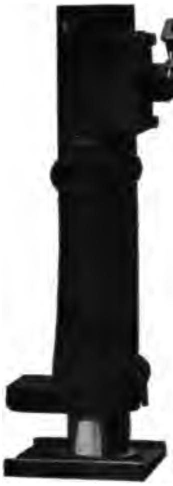
Jack Number	Capacity, Tons	Height, Bar Down, Inches	Raise of Bar, Inches	Height, Bar Raised, Inches	Weight with Lever, Pounds	Price, Each
00	1	12	6	18	8½	$3.50
*08	1	11	6	17	9½	3.50
06	1	10	5	15	8½	3.50
*07	1	8	5	13	7	3.50
24	2½	11¼	5½	16¾	14	6.00

*Not carried in stock but can be furnished on special orders for eastern shipment.

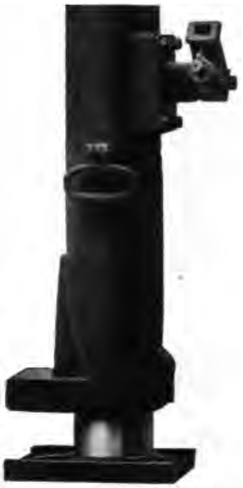
Ball Bearing Geared Ratchet Screw Jacks



Sectional Cut Ball Bearing Geared Ratchet Screw Jack
Fig. 661



No. 60—Fig. 662



No. 61—Fig. 663

Fig. 661 shows the construction of the Ball Bearing Geared Ratchet Screw Jacks. They are made entirely of refined malleable iron and steel. All gears are from high carbon steel, drop forged, and have machine-cut teeth.

The ratchet is of special construction, involving very few parts. It consists of a malleable iron cage surrounding the ratchet wheel on the shaft. Within this cage is a tool steel pawl pin which engages the teeth of the ratchet. The direction is changed by pulling this pin out and turning it half way round. This allows the pin to engage the ratchet in opposite direction.

The ball bearings used are the best of their kind and consist of two hardened, ground tool steel plates, each having a groove in which roll large alloy steel balls. These balls are carried in a bronze cage, each ball in a space by itself, thus eliminating all friction between the balls. This form of bearing is the most durable, most substantial, and most economical on the market.

The No. 60 Ball Bearing Geared Ratchet Screw Jack is adapted to bridge work and all general lifting purposes within the range of its capacity, and has a lifting toe by which low-set loads can be readily handled. The full rated capacity may be lifted on the top of the jack or one-half the rated capacity on the toe.

The No. 66 Jack is the same as No. 60, except it stands only 22-inches high and has a raise of only 10-inches.

The No. 61 Ball Bearing Geared Ratchet Screw Jack is adapted for all around work in repair shops, yards, bridge work, or for handling structural material. This Jack also covers the requirements of industrial concerns, contractors, trucking companies, in and around mills, factories, and machine shops. It has a lifting toe by which low-set loads can be readily handled. The full rated capacity may be lifted on the top of the jack or one-half the rated capacity on the toe.

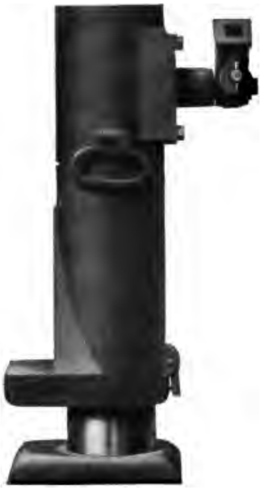
The No. 67 Jack is the same as No. 61, except it stands only 22-inches high and has a raise of only 10-inches.

Jack Number	Capacity, Tons	Height, Inches	Raise, Inches	Size of Base, Inches	Diameter of Head, Inches	Weight with Lever, Pounds	Price, Each
*60	15	26	13	5x 9	5	132	$70.00
66	15	22	10	5x 9	5	120	60.00
*61	25	27	13	8x11	6	196	96.00
67	25	22	10	8x11	6	167	90.00

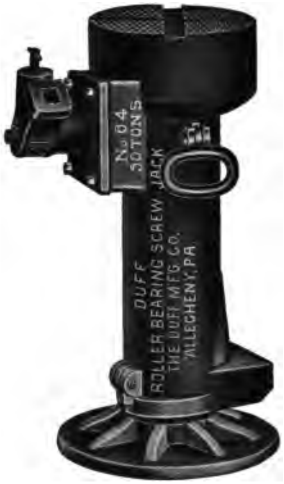
These jacks are regularly equipped with the improved ball bearing, but may be equipped with an interchangeable roller bearing, on special orders, if desired, the dimensions and prices being the same.

*Carried in stock.

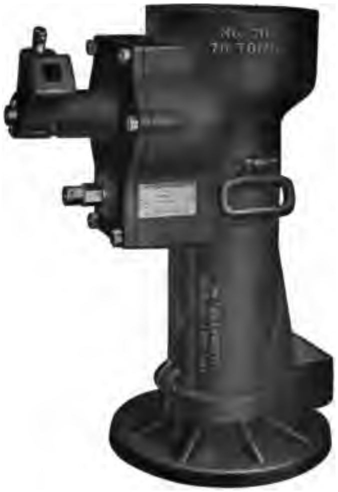
Ball Bearing Geared Ratchet Screw Jacks



No. 62—Fig. 664



No. 64—Fig. 665



No. 70—Fig. 666

The No. 62 Ball Bearing Geared Ratchet Screw Jack is adapted for extra heavy work of any character, including bridge, car or repair work. It will be found to meet every requirement. The full rated capacity may be lifted on the top of the jack or one-half the rated capacity on the toe.

The No. 68 Jack is the same as No. 62, except it stands only 22 inches high and has a raise of only 10 inches.

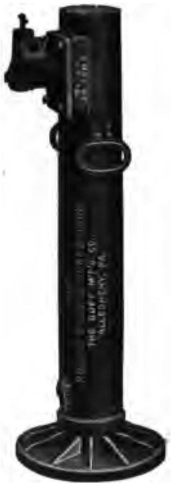
The No. 63 Ball Bearing Geared Ratchet Screw Jack is a modified form of the No. 61, and because of its height and raise, it is especially adapted to car work, requiring no blocking in order to raise any freight car or passenger coach.

The Nos. 81, 82, 83 and 84 Jacks differ from No. 63 only in height and in raise.

The No. 64 Ball Bearing Geared Ratchet Screw Jack has a round base, 14 inches in diameter and strongly ribbed. It is designed for heavy work.

The Nos. 65 and 69 Jacks differ from No. 64 only in height and in raise.

The No. 70 Ball Bearing Geared Ratchet Screw Jack contains a double set of gears and two shafts for operating by which a heavy load is more easily raised. All gears are forged steel, with machine cut teeth. For heavy lifting work these jacks are more reliable, more economical, more efficient and less troublesome than any other type of screw jack.



Nos 81, 82, 83, 84 and 63
Fig. 667

Jack Number	Capacity, Tons	Height, Inches	Raise, Inches	Size of Base, Inches	Diameter of Head, Inches	Weight with Lever, Pounds	Price, Each	Hook Extra, Each
*62	35	26	13	9x10½	6¾	250	$138.00	.....
68	35	22	10	9x10½	6¾	220	130.00	.....
63	25	36	23	12	6	230	100.00	$8.00
81	25	20	9	10	6	141	80.00	6.00
82	25	24	11	11	6	159	85.00	6.00
83	25	26	13	12	6	180	90.00	7.00
84	25	30	17	12	6	200	95.00	8.00
*64	50	27	13	14	10½	320	150.00	.....
65	50	24	9	14	10½	270	150.00	.....
69	50	20	5	14	10½	250	150.00	.....
*70	70	27	13	14	10½	370	200.00	.....

These jacks are regularly equipped with the improved ball bearing, but may be equipped with an interchangeable roller bearing, on special orders, if desired, the dimensions and prices being the same.

*Carried in stock.

Special Features of Merit and Advantage of Duff-Bethlehem Hydraulic Jacks

Strength—On account of the forged steel construction, all sizes of jacks are capable of withstanding an enormous overload and contain a greater factor of safety than any other jack.

Weight—All sizes are from 30 per cent. to 60 per cent. lighter than any other jacks of equal lifting capacity.

Piston—Height, when down, is less than in any other design. The ram will run out full lift in either vertical, inclined or horizontal position.

Tripping—Both valves are opened positively by slight pressure on the lever when the same is reversed, causing the load to be lowered. This may be regulated as slowly as required, or stopped at any point by varying the pressure.

Pump—The Telescope, or low type, is the only jack having a pumping stroke on both the upward and downward motion of the lever, automatically reducing the speed with a heavy load and increasing with a light load, to meet the varying conditions.

The "Duff-Bethlehem" Duplex Pump Jacks have a greater ratio between the small and the large pump pistons than any other design.

Accessibility—The valves can be attended to without removing the packing, and the packing without removing the valves.

Material—Open hearth fluid compressed forged steel and bronze are used throughout to secure lightness and strength. Inside working parts are drop forgings.

Construction—Both cylinder and ram have solid bottom, thus packing is required only for ram and pump piston. Axis of pump stroke coincides with that of pump well, insuring uniform wearing of pump packing. Flexible cup packing is used for both pump and ram. The Automatic valveless air vent allows free flow of air into and from reservoir of jack, and effectually prevents flow of filling liquid from reservoir when the jack is placed in horizontal position.

The two most troublesome packings and joints in all other hydraulic jacks are ENTIRELY ELIMINATED in the Duff-Bethlehem Jacks.

These jacks cannot "creep" under a load, as all possibility of leakage is eliminated in construction. They are always ready for instant service, are not troublesome, and practically cost nothing to maintain and to keep in constant operation.

General Instructions For Operating Duff-Bethlehem Hydraulic Jacks

1—To fill reservoir with liquid: Push the ram down to lowest position, remove the filling plug in the top of the head and fill, for summer use, with one part grain alcohol and four parts clear water. For winter use, two parts alcohol and three parts clear water. To either mixture add one ounce of sperm oil.

2—Keep the ram in lowered position when not in use.

3—Never fill with wood alcohol, kerosene, or water, and be very careful that dirt or foreign matter of any kind does not get into the head while filling.

4—Should the valves not operate freely, the trouble may be remedied by striking the lever a few sharp blows up and down.

5—If, when using, the liquid comes out over the top of the cylinder, or through the vent-hole, the ram packing is too loose and it should be tightened by setting up on the ram nut, or the edges may be spread by lightly hammering the packing, unless the same is worn out, in which case new packing is required.

6—If, when pumping, the ram does not rise, there is either something under the valves, or the pump packing is too loose.

7—If, when pumping, or under pressure, the lever rises, when the hand is removed, there is something under the discharge valve, or the seat is cut. Observe Rule 4 for the former. Regrind the valve and seat for the latter.

8—Be sure and wash all parts of the jack with clean water if same has been taken apart and is being reassembled.

9—The air vent in the filling plug requires practically no attention, as a sponge automatically fulfills the necessary functions. Fitting of a new sponge is easily made by unscrewing cap in the plug.

Duff-Bethlehem Forged Steel "Broad Base" Hydraulic Jacks

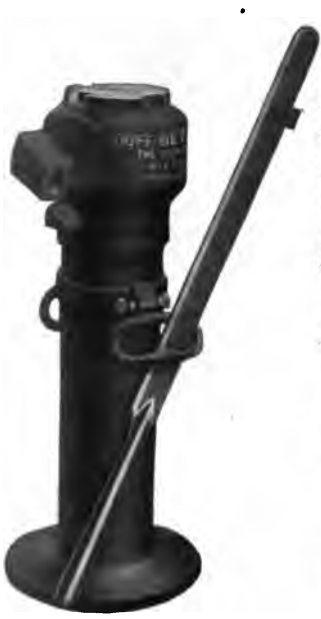


Fig. 668

The broad base of this type of jack gives a solid foundation. These jacks are used principally for railroad work in machine, car and locomotive shops.

The broad base is a solid steel forging, forged integrally with the cylinder. These jacks are considerably lighter in weight than any other make of hydraulic jack, made possible by the use of forgings throughout. They also have greater lifting capacity, are much stronger and more durable than other hydraulic jacks and cost practically nothing to maintain.

These jacks work in either a vertical, horizontal or inclined position.

Symbol	Capacity, Tons	Runout in Inches	Height, Inches	Diameter Base, Inches	Weight, Pounds	Price, Each
H	10	12	22¼	11	80	$ 78.00
HH	10	18	28¼	11	90	90.00
J	15	12	22½	11	100	100.00
JJ	15	18	28½	11	114	120.00
K	20	9	20⅛	12	106	110.00
KK	20	12	23⅛	12	114	120.00
*KKK	20	18	29¼	12	126	140.00
L	30	9	21¼	12	124	135.00
LL	30	12	24¼	12	135	150.00
LLL	30	18	30¼	12	150	175.00
M	40	9	21⅜	12	129	165.00
MM	40	12	24⅜	12	141	180.00
MMM	40	18	30⅜	12	160	220.00
P	50	12	26⅝	13	190	210.00
*PP	50	18	33⅞	13	212	260.00
R	60	12	27	14	230	290.00
RR	60	18	33½	14	253	350.00

*Carried in stock.

Duff-Bethlehem Forged Steel "Fixed Claw" Hydraulic Jacks

This type of jack is used principally in machine shops and where there is not sufficient room to get the head of the jack underneath the load.

The claw, or toe piece, is a drop forging, a feature found only in Duff-Bethlehem Jacks, and it will stand the full rated capacity of the jack. These jacks work in either a vertical, horizontal or inclined position.

Symbol	Capacity, Tons	Runout in Inches	Height, Inches	Diameter Base, Inches	Weight, Pounds	Price, Each
BX	15	12	22¼	6½	105	$125.00
*BBX	15	18	28¼	6½	132	140.00
CX	20	9	19⅞	7¼	140	145.00
CCX	20	12	22⅞	7¼	160	165.00
CXX	20	18	29	7¼	180	185.00
DX	30	9	21	8	195	185.00
DDX	30	12	24	8	210	210.00
DXX	30	18	30	8	240	245.00
EX	40	12	24⅛	8	217	250.00
EEX	40	18	30⅛	8	250	280.00
FX	50	12	26⅜	8½	270	280.00
FFX	50	18	33⅝	8½	300	340.00

*Carried in stock.

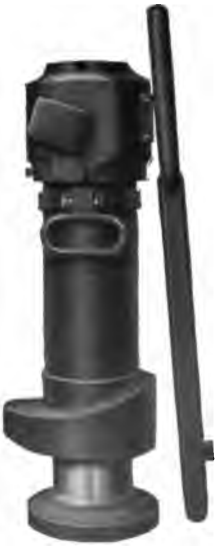
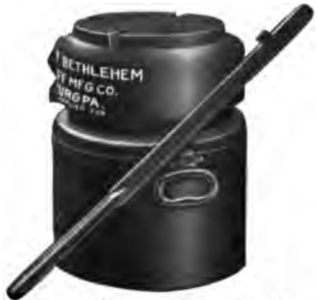


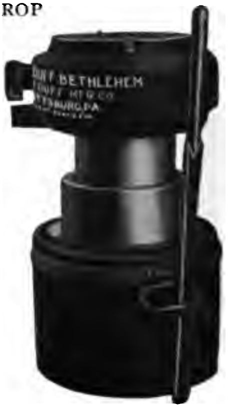
Fig. 669

Duff-Bethlehem Forged Steel "Low Type" or Telescope Hydraulic Jacks

FOR A VERTICAL OR HORIZONTAL LIFT, FITTED WITH AN IMPROVED DUPLEX PUMP AND ARRANGED TO USE A DROP FORGED STEEL INDEPENDENT CLAW



"Low" or Telescope Jack—Closed
Fig. 670



"Low" or Telescope Jack—Extended
Fig. 671

These jacks are the highest grade hydraulic jacks that have ever been developed, and for heavy lifting are the most economical, efficient, and positive on the market. In design, construction, and workmanship they have no equal. These jacks are used where a low jack is required with a long lift. On account of their forged steel construction, they are from 30 per cent. to 80 per cent. lighter in weight than any other hydraulic jack on the market of equal capacity and stroke. They are also more powerful, more durable, and much more economical than any other make of jack. The valves are absolutely positive. On account of their forged steel construction, the bottom of the ram and bottom of the cylinder are solid, dispensing with packings and joints which are bound to appear on every other make of jack and which cause great trouble and expense.

On the 30-ton and 40-ton sizes the pump is single-acting, and on all other sizes from 50-tons to 250-tons, inclusive, an improved double-acting pump is used, automatically regulating the change of speed proportional with the load being lifted.

An important feature of these jacks is that for one-half of their run out their capacity is double their rated capacity.

These jacks work in either vertical, horizontal or inclined position.

Symbol	Capacity, Tons	Runout in Inches	Height Closed, Inches	Diameter Base, Inches	Weight, Pounds	Price, Each
DK	30	12	18¾	10	195	$170.00
DKK	30	18	21¾	10	200	200.00
DL	40	12	18¾	10	200	200.00
DLL	40	18	21¾	10	220	240.00
DM	50	12	17¼	9½	230	225.00
DMM	50	18	20¼	9½	250	265.00
DO	60	12	17½	9½	230	235.00
DOO	60	18	22½	9½	280	290.00
DP	80	9	17⅜	10½	278	270.00
DPP	80	12	18⅞	10½	340	285.00
DDP	80	18	21⅞	10½	400	340.00
DS	100	9	17¾	12	425	320.00
*DSS	100	12	19½	12	460	340.00
*DDS	100	18	23½	12	510	415.00
DT	125	12	20	13½	500	400.00
DTT	125	18	23	13½	560	460.00
DV	150	9	18⅜	14½	500	430.00
DVV	150	12	20	14½	530	450.00
DY	200	9	19	15¾	600	490.00
DYY	200	12	20½	15¾	650	520.00
DZ	250	9	19½	18	700	610.00
DZZ	250	12	21	18	760	650.00
DDZ	250	18	24	18	950	800.00

All of the above Jacks are fitted to use an Independent Claw if desired. Prices upon application.
*Carried in stock.

Duff-Bethlehem Forged Steel "Low Journal Box" Hydraulic Jacks

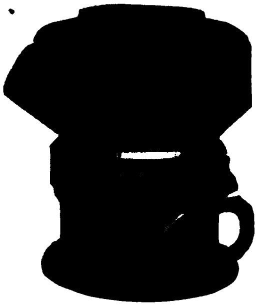


Fig. 672

These jacks are made with a 5-inch stroke and are only 10 inches over all in height, and are used for removing the brasses by car inspectors.

These jacks work in either vertical, horizontal or inclined position.

Symbol	Capacity, Tons	Runout in Inches	Height Closed, Inches	Diameter Base, Inches	Weight, Pounds	Price, Each
AJ	10	5	10	7	49	$ 75.00
BJ	15	5	10	7½	53	95.00
CJ	25	5	10	8	75	115.00

Locomotive Jack Screws

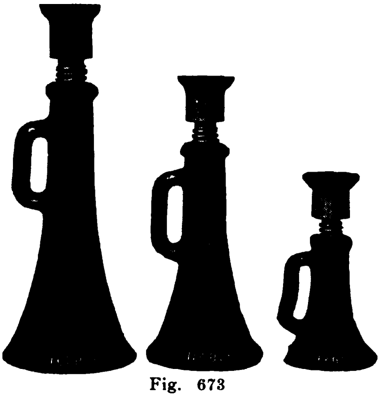


Fig. 673

CAPACITY OF JACK SCREWS

1¼-inch screws	10 tons
1½-inch screws	12 tons
1¾-inch screws	16 tons
2 -inch screws	20 tons
2½-inch screws	28 tons
3 -inch screws	36 tons

FOR HEIGHT OVER ALL ADD TO HEIGHT OF THE STAND

1¼-inch screws	2½ inches
1½-inch screws	2¾ inches
1¾-inch screws	3 inches
2 -inch screws	3½ inches
2½-inch screws	4 inches
3 -inch screws	5 inches

	Price—Each						
Height of stand.....inches	8	10	12	14	16	18	20
1¼-inch Diameter of screw	$3.40	.....	.....	.....	.....	.....	.....
1½-inch " " "	.....	4.75	5.25	6.00	.....	.....	.....
1¾-inch " " "	.....	.....	6.25	6.75	7.50	8.50	.....
2 -inch " " "	.....	.....	7.50	8.25	9.25	10.25	.....
2½-inch " " "	.....	.....	.....	12.00	13.25	14.50	.....
3 -inch " " "	.....	.....	.....	.....	20.75	22.00	23.25

Levers will be sent only when ordered, and will be charged extra.

“Cyclone” High Speed Chain Hoists

WITH SELF-LUBRICATING BEARINGS

The bearings of the hoist have Graphite Bronze Bushings. They are self-lubricating, they require no oil, and will run indefinitely without cutting.

ALL GEARS MACHINE CUT

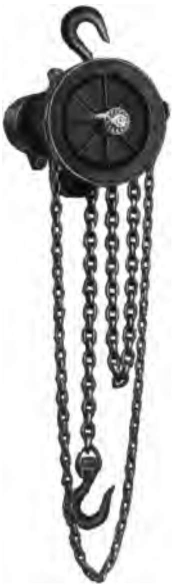
The two-ton hoist overhauls 47 feet of hand chain to raise the maximum load one foot with a pull of 109 pounds.

The average speed of the best types of screw hoists in the two-ton size is 90 feet overhaul of hand chain with a pull of 120 pounds to raise the load one foot. It is therefore evident that the “Cyclone” is more than twice as fast. It can be geared to a higher speed than any other hoist with no greater hand-wheel pull. There is the least possible friction loss, the efficiency averaging nearly 80 per cent.

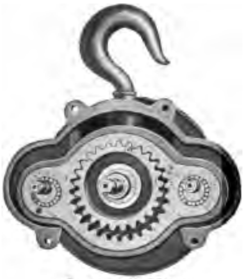
When there is no load the hand wheel may be spun in either direction.

When the hand chain is released the automatic brake immediately locks the hoist so that the load is safely held at any point.

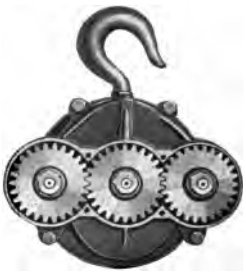
It may be readily lowered, however, by a reverse pull on the hand chain.



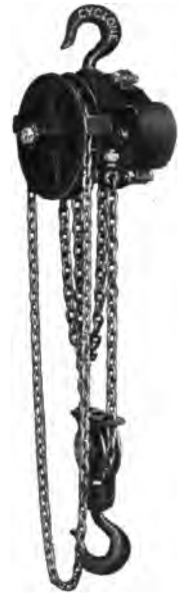
One-Half to Two-Ton Sizes This Style
Fig. 674



Internal View
Fig. 675



Internal View
Fig. 676



Three to Twelve-Ton Sizes This Style
Fig. 677

Capacity, Tons	Price Complete, Each	Height of Lift, Feet	Extra Chain per Foot of Lift	Weight Complete, Pounds	Chain Pull to Lift Full Load, Pounds	Feet of Chain Handled to Lift Load One Foot	Shortest Distance Between Hooks, Inches
½	$ 35.00	8	$0.90	62	64	20½	15
1	45.00	8	.95	85	79	33	17
1½	60.00	8	1.00	107	100	39	19
2	70.00	9	1.05	160	109	47	21
3	90.00	10	1.50	195	115	69	32
4	110.00	10	1.60	250	115	91	34
5	140.00	12	2.10	386	104	123	38
6	165.00	12	2.10	402	109	140	41
8	200.00	12	2.70	464	135	159	43
10	240.00	12	3.25	610	144	191	47
12	300.00	12	3.30	647	160	195	50
16	360.00	12	3.80	872	149	285	44
20	425.00	12	6.50	1360	160	336	50
30	525.00	12	9.00	1780	160	504	63
40	650.00	12	11.50	2030	160	670	82

Figures in third column denote approximate height which hoists, with regular lengths of chain, will lift from level on which operator stands.

For every additional foot of lift desired, two feet extra of both main and hand chain will be necessary.

"Moore Anti-Friction" Chain Hoists

WITH RECENTLY IMPROVED BRAKE

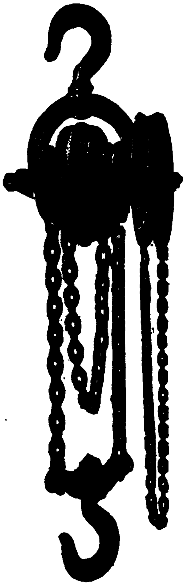


Fig. 678

This hoist has recently been improved by equipping it with a new and very efficient automatic brake, which absolutely locks the load at all points and yet with a slight reverse pull on the chain releases the brake and the load may be lowered by a free and smooth movement.

It is a good, well-built hoist for general work and will stand hard usage. The chains are made of the highest grade of material and are tested and stretched to gauge on a pull 100 per cent. greater than the maximum load they are intended to carry.

Capacity, Tons	Price Complete, Each	Extra Main Chain, Per Foot	Extra Hand Chain, Per Foot	Extra Chain per Foot of Lift	Height of Lift, Feet	Weight Complete, Pounds	Shortest Distance Between Hooks, Inches	Feet of Chain Handled to Lift Load One Foot
½	$ 25.00	$0.40	$0.25	$1.30	8	39	17⅜	38
1	30.00	.44	.25	1.38	8	73	21	47
1½	40.00	.48	.25	1.46	8	90	21½	59
2	50.00	.52	.25	1.54	9	128	24	65
3	70.00	.60	.25	1.70	10	195	28	108
4	95.00	.70	.25	1.90	11	250	29	120
5	125.00	.80	.25	2.10	12	353	34½	166
6	150.00	.80	.25	2.10	12	400	36	168
8	200.00	1.25	.25	3.00	12	580	40	240
10	250.00	1.25	.25	3.50	12	625	43	258

Figures in sixth column denote approximate height which hoists, with regular lengths of chain, will lift from level on which operator stands.

For every additional foot of lift desired, two feet extra of both main and hand chain will be necessary.

"Direct" Differential Chain Hoists

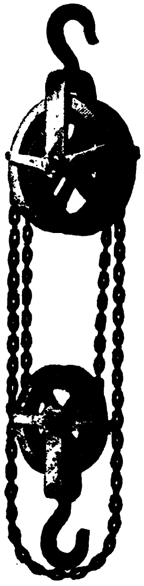


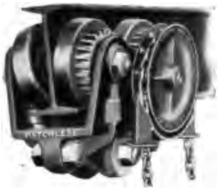
Fig. 679

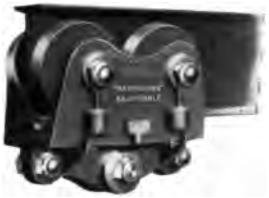
These chain hoists are heavy, well made, of good material and thoroughly tested.

Capacity, Tons	Price Complete, Each	Will Lift, Feet	Regular Chain, Feet	Extra Chain, Per Foot	Weight Complete, Pounds	Shortest Distance Between Hooks, Inches
¼	$18.00	6	22	$0.70	20	17
½	21.00	7	26	.70	31	21
1	28.00	8	30	.75	53	26
1½	36.00	8½	33	.80	90	32
2	45.00	9	36	.85	128	39
3	60.00	10	38	1.00	167	44

Allow four feet of chain for each additional foot of lift.
Always specify "Direct" when ordering this style of hoist.

"Matchless"
Adjustable Malleable Frame Trolleys


Geared Trolley
Fig. 680


Plain Trolley
Fig. 681

These trolleys are readily adjusted to the different size I beams specified in the price list. They have flangeless track wheels with vertical guide rollers.

The track wheels have hardened steel roller bearings (hardened steel bushings pressed into the wheels, hardened steel axles and hardened steel rollers enclosed in brass cages).

On the Geared Trolley, the gears are cut. They work very freely and have a large safety factor.

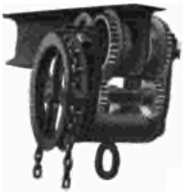
The hoist is hung on the central bolt. The top of the hoist hook reaches to within one inch of the I beam, making a very close connection.

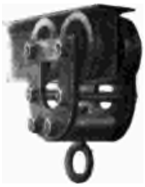
IN ORDERING STATE SIZE AND WEIGHT OF I BEAM

Capacity	Tread Diameter of Wheel, Inches	Adjustable for Sizes of I Beams	Weight Geared Trolley, Pounds	Price Geared Trolley, Each	Weight Plain Trolley, Pounds	Price Plain Trolley, Each
1000 lbs.	4	5— 6— 7 inch	...	......	35	$20.00
2000 "	5	6— 7— 8 "	60	$35.00	47	24.00
3000 "	5	6— 7— 8 "	70	38.00	56	26.00
4000 "	6	7— 8— 9 "	90	40.00	74	28.00
6000 "	6½	8— 9—10 "	118	47.00	102	33.00
8000 "	7	9—10—12 "	177	52.00	155	37.00
10000 "	8	10—12—15 "	218	65.00	194	43.00
12000 "	8	10—12—15 "	265	80.00	240	55.00
16000 "	9	12—15—18 "	421	95.00	378	70.00
20000 "	10	15—18—20—24 "	480	115.00	434	85.00

Geared and Plain Yoke Trolleys

FORGED FRAME, FOUR WHEELS, STEEL ROLLER BUSHED


Geared Trolley
Fig. 682

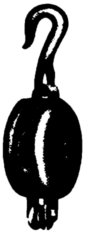

Plain Trolley
Fig. 683

IN ORDERING STATE SIZE AND WEIGHT OF I BEAM

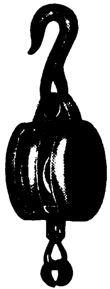
Capacity	Tread Diameter of Wheel, Inches	Weight Geared Trolley, Pounds	Price Geared Trolley, Each	Weight Plain Trolley, Pounds	Price Plain Trolley, Each	Distance from Under Side of Beam to Bottom of Swivel Eye	
						Geared	Plain
2000 lbs.	5	110	$35.00	70	$24.00	9¾ inch	8¾ inch
3000 "	5	120	38.00	75	26.00	9¾ "	8¾ "
4000 "	5	132	40.00	85	28.00	9¾ "	8¾ "
6000 "	5½	165	47.00	90	33.00	10 "	9 "
8000 "	6	225	52.00	150	37.00	10¼ "	10¼ "
10000 "	6	242	65.00	180	43.00	11 "	11 "
12000 "	8	320	80.00	230	55.00	13¾ "	13¾ "
16000 "	9	390	95.00	295	70.00	14½ "	14½ "
20000 "	9	415	115.00	330	85.00	14½ "	14½ "

Regular Inside Iron Strapped Wood Blocks

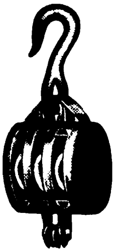
WITH LOOSE SIDE HOOKS
FOR MANILA ROPE—WITH OR WITHOUT BECKETS



Single
Fig. 684



Double
Fig. 685



Triple
Fig. 686

Dimensions			Iron Bushed			Improved Roller Bushed		
Size Sheave, Inches	For Dia. Rope, Inches	Length Shell, Inches	Single, Each	Double, Each	Triple, Each	Single, Each	Double, Each	Triple, Each
1¾x ½x⅜	⅜	3	$0.70	$1.30	$1.75	$1.10	$2.00	$2.90
2 x ½x⅜	⅜	3½	.75	1.45	2.00	1.15	2.20	3.15
2¼x ⅝x⅜	½	4	.85	1.60	2.15	1.20	2.25	3.25
3 x ¾x⅜	⅝	5	.90	1.75	2.25	1.25	2.35	3.50
3½x1 x½	¾	6	1.10	2.00	2.90	1.50	2.85	4.40
4¼x1 x½	⅞	7	1.30	2.40	3.50	1.70	3.35	5.00
4¾x1⅛x⅝	1	8	1.65	2.85	4.25	2.25	4.15	6.00
5½x1⅛x⅝	1	9	1.85	3.40	4.75	2.50	4.70	7.25
6¼x1¼x⅝	1⅛	10	2.75	4.50	6.25	3.50	6.00	8.50
7¼x1¼x¾	1⅛	11	4.45	7.50	10.65	5.30	9.20	13.20
8 x1⅜x¾	1¼	12	4.45	7.50	10.65	5.30	9.20	13.20
9 x1½x¾	1¼	13	7.00	10.50	15.00	8.15	12.80	18.45
9½x1⅝x⅞	1⅜	14	7.00	10.50	15.00	8.15	12.80	18.45
10 x1⅝x⅞	1½	15	8.00	13.00	18.00	9.25	15.50	21.75
11 x1¾x⅞	1⅝	16	10.00	15.00	22.00	11.50	18.00	26.50

For lists of extra sheaves, see page 283.

Wood Shell Snatch Blocks

IRON STRAPPED—DROP LINK

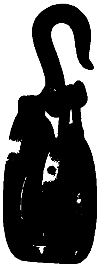


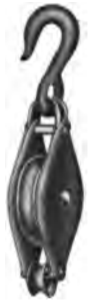
Fig. 687

Size Sheave, Inches	For Dia. Rope, Inches	Length Shell, Inches	Iron Bushed, Each	Self-Lubricating Iron Bushed, Each	Improved Roller Bushed, Each	Self-Lubricating Phosphor Bronze or Metaline Bushed, Each
3 x1⅛x ½	⅞	6	$4.00	$4.00	$4.65	$5.25
3½x1¼x ½	⅞	7	4.75	4.75	5.50	6.00
4½x1⅜x ⅝	1	8	5.75	5.75	6.60	7.25
5 x1⅜x ⅝	1⅛	9	6.75	6.75	7.75	8.50
5¾x1⅞x ¾	1¼	10	8.50	8.50	10.00	11.00
6¾x2⅛x ¾	1½	12	10.00	10.00	11.50	13.00
8 x2¼x ⅞	1¾	14	13.00	13.00	15.00	16.50
9 x2⅝x1	2	16	17.00	17.00	20.00	22.00
10 x3 x1⅛	2¼	18	25.00	25.00	28.50	31.00
11 x3½x1¼	2½	20	38.00	38.00	43.00	46.00
11¾x4¼x1½	3	22	55.00	55.00	63.00	68.00
12½x4½x1½	3½	24	70.00	70.00	78.00	86.00
14 x4¾x1¾	4	26	90.00	90.00	....	110.00

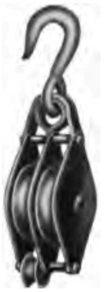
Use the "Improved Roller Bushed" lists for blocks with five-roller bushed sheaves.
For lists of extra sheaves, see page 284.

Hollow Steel Blocks

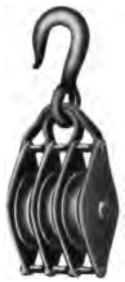
WITH LOOSE SIDE HOOKS
FOR MANILA ROPE



Single
Fig. 688



Double
Fig. 689



Triple
Fig. 690

These blocks are made with double plates for sides and middles, the edges of which are well turned and fitted together, and all straps are run to bottom of blocks between these plates.

This construction, together with the heavy separators used, makes a very stiff, strong block suitable for rough usage.

On account of angle given to turned edges and the fact that stock in plates is much heavier, there is no danger of rope wearing through the sides and being cut, as in the old style hollow steel.

Dimensions			Self-Lubricating Iron Bushed			Improved Roller Bushed			Self-Lubricating Phosphor Bronze or Metaline Bushed		
Dia. Sheave, Inches	For Dia. Rope, Inches	Length Shell, Inches	Single, Each	Double, Each	Triple, Each	Single, Each	Double, Each	Triple, Each	Single, Each	Double, Each	Triple, Each
1¾	⅜	3	$0.85	$1.65	$2.35	$1.20	$2.35	$3.35	$1.60	$3.15	$4.60
2¼	½	4	.90	1.75	2.50	1.25	2.45	3.50	1.65	3.25	4.75
3	⅝	5	1.00	1.90	2.75	1.35	2.60	3.65	1.80	3.50	5.15
3½	¾	6	1.25	2.25	3.25	1.65	3.05	4.25	2.10	4.00	5.80
4¼	⅞	7	1.50	2.70	4.00	1.90	3.50	4.70	2.45	4.60	6.85
4¾	1	8	1.85	3.20	4.75	2.45	4.40	6.20	2.90	5.30	7.90
5½	1	9	2.40	4.00	5.50	3.00	5.20	7.00	3.55	6.30	9.00
6¼	1⅛	10	3.10	5.10	7.00	3.85	6.60	8.85	4.40	7.70	11.00
8	1¼	12	5.00	8.25	11.75	5.85	9.95	14.30	6.45	11.15	16.00
9½	1⅜	14	7.50	11.75	16.50	8.75	14.25	20.25	9.10	15.00	21.30

For lists of extra sheaves, see page 283.

Hollow Wrought Iron Snatch Blocks

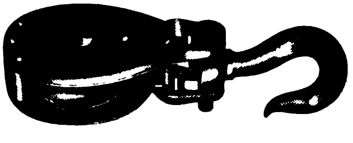


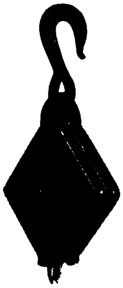
Fig. 691

Size Sheave, Inches	For Dia. Rope, Inches	Length Shell, Inches	Self-Lubricating Iron Bushed, Each	Improved Roller Bushed, Each	Self-Lubricating Phosphor Bronze or Metaline Bushed, Each
3 x1⅛x ½	⅞	6	$4.50	$5.15	$5.75
3½x1¼x ½	⅞	7	5.50	6.25	6.75
4½x1⅜x ⅝	1	8	6.50	7.35	8.00
5 x1⅜x ⅝	1⅛	9	7.50	8.50	9.25
5¾x1⅞x ¾	1¼	10	10.00	11.50	12.50
6¾x2⅛x ¾	1½	12	12.50	14.00	15.50
8 x2¼x ⅞	1¾	14	16.00	18.00	19.50
9 x2⅝x1	2	16	21.00	24.00	26.00

For lists of extra sheaves, see page 284.

Wrought Iron Blocks for Wire Rope

REGULAR PATTERN
DIAMOND SHELL
WITH STIFF SWIVEL OR LOOSE SIDE HOOKS

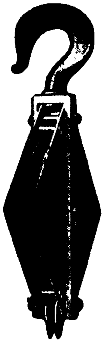

Double with Loose Side Hook
Fig. 692

Dimensions		Iron Bushed			Self-Lubricating Phosphor Bronze or Metaline Bushed		
Size Sheave, Inches	For Dia. Rope, Inches	Single, Each	Double, Each	Triple, Each	Single, Each	Double, Each	Triple, Each
10x1¼x ⅞	⅝	$10.00	$15.00	$20.00	$13.00	$21.00	$28.00
12x1½x1	⅝	12.00	17.00	23.00	15.00	23.00	31.00
14x1½x1	¾	14.00	19.00	26.00	17.00	25.00	34.00
16x1½x1¼	⅞	16.00	22.00	30.00	19.50	29.00	40.00

These blocks can be furnished with loose front hooks or shackles on special orders for factory shipment at no additional expense.

Wrought Iron Blocks for Wire Rope

EXTRA HEAVY PATTERN
DIAMOND SHELL
WITH STIFF SWIVEL OR LOOSE FRONT HOOKS


Single with Stiff Swivel Hook
Fig. 693

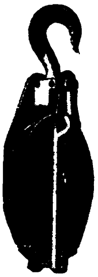
Dimensions		Iron Bushed			Self-Lubricating Phosphor Bronze or Metaline Bushed		
Size Sheave, Inches	For Dia. Rope, Inches	Single, Each	Double, Each	Triple, Each	Single, Each	Double, Each	Triple, Each
10x1¼x1	⅝	$14.00	$20.00	$28.00	$17.00	$26.00	$37.00
12x1½x1⅛	¾	16.00	23.00	31.00	19.00	29.00	41.00
14x1½x1¼	¾	18.00	25.00	36.00	21.00	31.00	45.00
16x1¾x1½	⅞	31.00	40.00	46.00	36.00	50.00	65.00
18x1¾x1½	1	34.50	45.00	60.00	40.00	56.00	75.00

The center straps in double and triple blocks extend full length of shell, furnishing proper support for center pin in middle of the block.

These blocks can be furnished with shackles on special orders for factory shipment at no additional expense or with loose swivel hooks at a slight additional expense.

Wrought Iron Snatch Blocks for Wire Rope

WITH SELF-LOCKING CLASP


Self-Locking Clasp
Fig. 694

Diameter Sheave, Inches	For Diameter Rope, Inches	Iron Bushed, Each	Self-Lubricating Phosphor Bronze or Metaline Bushed, Each
10	⅝	$16.00	$18.00
12	⅝	18.00	21.00
14	¾	20.00	23.00
16	⅞	28.00	33.00

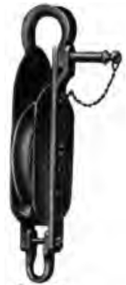
These blocks have a center extension piece coming close to the sheave, preventing the wire rope from leaving the sheave. It also prevents the shell from binding or pinching the sheave.

Producers' Snatch Blocks

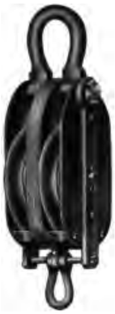
IRON SHELL

EXTRA HEAVY PITTSBURG PATTERN

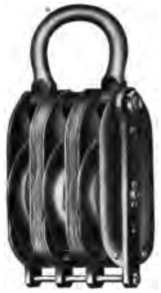
SELF-OILING SHEAVES FOR MANILA OR WIRE ROPE



Single
Fig. 695



Double
Fig. 696



Triple
Fig. 697

SINGLE BLOCKS

Size Sheave, Inches	Length Shell, Inches	Diameter Rope—Inches		Weight, Pounds	Price, Each
		Manila	Wire		
10x2⅜	18	2⅛	⅞	67	$15.00
11x2⅜	20	2⅛	⅞	90	17.00
12x2⅝	22	2⅛	1	105	19.00
14x2⅞	24	2½	1	150	21.00
15x3	26	2½	1¼	190	25.50
16x3⅛	28	2½	1¼	200	30.00
18x3⅛	30	2½	1¼	...	37.00

DOUBLE AND TRIPLE BLOCKS

Size Sheave, Inches	Length Shell, Inches	Diameter Rope—Inches		Double		Triple	
		Manila	Wire	Weight, Pounds	Price, Each	Weight, Pounds	Price, Each
11x2⅜	18	2⅛	⅞	158	$34.00	210	$39.00
12x2⅝	20	2⅛	⅞	200	38.00	275	46.00
14x2⅞	22	2⅛	1	260	42.50	360	53.00
15x3	24	2½	1	335	45.00	455	59.00
16x3⅛	26	2½	1¼	385	50.00	520	68.00
18x3⅛	28	2½	1¼	440	55.00	575	75.00
20x3⅛	30	2½	1¼	...	84.00	...	94.00

In the double and triple iron shell blocks, the middle partitions consist of double plates, separated by wood filling. Between the plates a heavy iron strap runs from top to bottom, held at the top by the head bolt. These plates and straps furnish proper support for center pin in the middle.

In ordering, state whether blocks are to carry Manila or wire rope.

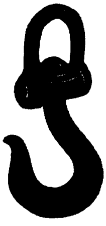


Fig. 698

Double Swivel Hooks

FOR PRODUCERS' SNATCH BLOCKS

Diameter of hook................inches	1½	1⅝	1¾	2	2¼	2½
Weight ....pounds Price ....each	10 $2.80	13 3.00	18 3.50	25 4.00	35 6.50	45 10.00
Diameter of hook................inches	2¾	3	3¼	3½	.....	.....
Weight ....pounds Price ....each	60 $13.20	75 14.00	100 21.00	120 24.00	....	....

"Hartz" Self-Oiling Steel Hay Fork Blocks

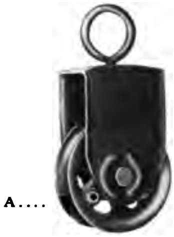


Fig. 699

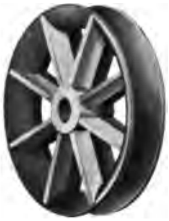
Steel shell, wrought iron swivel ring, iron sheave 4¼-inch diameter by 1½-inch wide. Edges of shell are upset and turned out to prevent wear of rope.

The letter "A" in the cut shows chamber in sheave, which can be filled with grease, tallow or oil and then corked up. The lubricant feeds on the solid pin or axle, no matter in what position the block is used.

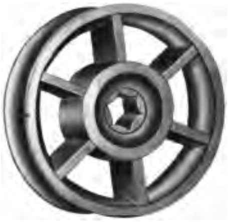
Per dozen..................................$6.00

Iron Sheaves

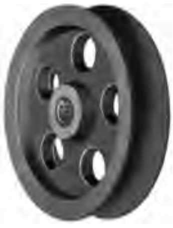
FOR REGULAR INSIDE IRON STRAPPED WOOD BLOCKS AND HOLLOW STEEL BLOCKS



Iron Bushed
Fig. 700



Improved Roller Bushed
Fig. 701

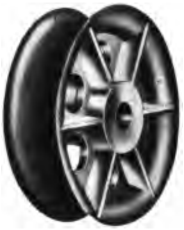


Metaline Bushed
Fig. 702

FOR MANILA ROPE

Size Sheave, Inches	For Dia. Rope, Inches	For Block, Inches	Iron Bushed, Each	Improved Roller Bushed, Each	Phosphor Bronze or Metaline Bushed, Each
1¾x ½x⅜	⅜	3	$0.09	$0.40	.....
2 x ½x⅜	⅜	3½	.10	.42	$0.60
2¼x ⅝x⅜	½	4	.12	.45	.70
2¾x ¾x⅜	⅝	4½	.15	.50	.80
3 x ¾x⅜	⅝	5	.20	.55	.90
3½x1 x½	¾	6	.25	.65	1.40
4¼x1 x½	⅞	7	.30	.75	1.50
4¾x1⅛x⅝	1	8	.35	1.00	1.85
5½x1⅛x⅝	1	9	.45	1.10	1.95
6¼x1¼x⅝	1⅛	10	.55	1.35	2.25
7¼x1¼x¾	1⅛	11	.70	1.65	2.60
8 x1⅜x¾	1¼	12	.90	1.90	2.95
9 x1½x¾	1¼	13	1.20	2.40	3.25
9½x1⅝x⅞	1⅜	14	1.40	2.65	3.60
10 x1⅝x⅞	1½	15	1.50	2.85	3.90
11 x1¾x⅞	1⅝	16	1.70	3.20	4.90

The bushing is the life of the sheave, and we strongly recommend the phosphor bronze or metaline bushing for heavy and rapid hoisting.



Iron Bushed
Fig. 703

Iron Sheaves

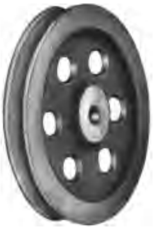
FOR WOOD SHELL SNATCH BLOCKS AND
HOLLOW WROUGHT IRON SNATCH BLOCKS

FOR MANILA ROPE

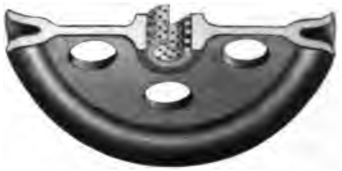
Size Sheave, Inches	For Dia. Rope, Inches	For Block, Inches	Iron Bushed, Each	Improved Roller Bushed, Each	Phosphor Bronze or Metaline Bushed, Each
3 x1⅛x ½	⅞	6	$0.30	$0.75	$1.40
3½x1¼x ½	⅞	7	.40	.85	1.60
4½x1⅜x ⅝	1	8	.50	1.20	1.90
5 x1⅜x ⅝	1⅛	9	.60	1.30	2.00
5¾x1⅞x ¾	1¼	10	1.20	2.40	3.00
6¾x2⅛x ¾	1½	12	1.50	2.85	3.75
8 x2¼x ⅞	1¾	14	1.85	3.45	4.50
9 x2⅝x1	2	16	2.25	4.50	5.50
10 x3 x1⅛	2¼	18	3.00	6.00	7.00
11 x3½x1¼	2½	20	4.00	8.00	9.00
11¾x4¼x1½	3	22	6.50	11.50	13.00
12½x4½x1½	3½	24	9.00	15.00	18.00

The bushing is the life of the sheave, and we strongly recommend the phosphor bronze or metaline bushing for heavy and rapid hoisting.

Iron Sheaves for Wire Rope



DEEP
GROOVES



Iron Bushed
Fig. 704

Phosphor Bronze Bushed
Fig. 705

Size Sheave, Inches	Thickness at Hub, Inches	For Dia. Rope, Inches	Iron Bushed, Each	Phosphor Bronze or Metaline Bushed, Each
8x1 x ¾	1⅛	½	$1.25	$2.65
8x1¼x ⅞	1⅜	⅝	1.50	3.00
10x1 x ⅞	1⅛	½	1.80	3.50
10x1⅛x ⅞	1¼	½	2.10	3.85
10x1¼x ⅞	1⅜	⅝	2.25	4.00
10x1¼x1	1⅜	⅝	2.25	4.40
12x1 x1	1⅛	½	2.50	4.25
12x1¼x1	1½	⅝	3.00	5.00
12x1½x1	1⅝	¾	3.20	5.25
12x1½x1⅛	1⅝	¾	3.20	5.40
14x1½x1	1⅝	⅝ and ¾	4.40	6.50
14x1½x1⅛	1¾	⅞	4.40	6.75
14x1½x1¼	1⅝	⅝ and ¾	4.45	7.00
16x1½x1¼	1¾	⅝	6.00	8.75
16x1½x1¼	1¾	¾ and ⅞	6.00	8.75
16x1½x1½	1¾	¾ and ⅞	6.25	9.25
16x1¾x1½	2	⅞	7.00	10.25
18x1¾x1¼	2	⅞ and 1	10.00	13.00
18x1¾x1½	2	⅞ and 1	10.25	13.25

The bushing is the life of the sheave, and we strongly recommend the phosphor bronze or metaline bushing for heavy and rapid hoisting.

Manila Rope

Wire Rope

Galvanized Oval Thimbles

Wire Rope Clips

Pages 285 to 291 Inclusive

Manila Rope

Our Manila rope is made from pure Manila hemp, no adulterant, inferior fibre, or weighing substance of any kind used.

We carry a large stock of all sizes of rope and are in a position to furnish special rope for transmission purposes, yacht rigging, etc., on very short notice.

Basis per pound	Market

Basis is the price of ⅝-inch diameter (2-inch circumference) and larger for three-strand rope.

⅝-inch diameter (2-inch circumference) and larger	Basis
9/16-inch diameter (1¾-inch circumference)	½¢ above Basis
½-inch diameter (1½-inch circumference)	½¢ above Basis
7/16-inch diameter (1¼-inch circumference)	½¢ above Basis
⅜-inch diameter (12 thread)	1¢ above Basis
5/16-inch diameter (9 thread)	1½¢ above Basis
¼-inch diameter (6 thread)	1½¢ above Basis
3/16-inch diameter (6 thread fine)	2¢ above Basis
Bale, 2-thread and up	Basis
1-thread	½¢ above Basis
Balling, other than Harvesting Twine	¼¢ extra
Bolt Rope, "Extra Superior Manila"	3¢ above Basis
Bull Rope, "Extra Superior Manila"	2¢ above Basis
Buoy Line, "Extra Superior Manila"	1¢ above Basis
Calf Rope, "Extra Superior Manila"	2¢ above Basis
Cable Laid—Stock Rope, full coils	1¢ above Basis
Extra Superior Manila Rope, Clover Leaf brand	1¢ above Basis
Fisherman's Rope, "Extra Superior Manila" soft laid, steam tarred or untarred	1¢ above Basis
Four-strand, ⅝-inch diameter (2-inch circumference) and larger	1¢ above Basis
9/16-inch diameter (1¾-inch circumference) and smaller	1¢ above Basis
Hay Stacking Rope, "Extra Superior Manila" center of strands graphited	1¢ above Basis
Hide Rope, special unoiled, "Extra Superior Manila"—	
2-ply and upwards	1¼¢ above Basis
1-ply	1¾¢ above Basis
Lariat Rope, red thread "Bronco Brand"—	
3-strand hard twisted, unoiled	4¢ above Basis
4-strand hard twisted, unoiled	4½¢ above Basis
Lariats, made up ready for use	Special
Lanyard and Tarred Rope	Basis
Life Line Lariat, highest grade manufactured	Special
Lobster Marline	3½¢ above Basis
Net Lines, "Extra Superior Manila"	1¢ above Basis
Oil Well Drilling Cables, "Purple Thread"	Special
Pile-Driving or Hoisting Rope, hard, graphite laid	3¢ above Basis
Paper Twine, unoiled, reels or coils	1¢ above Basis
Sand Line	Special
Seine Line	1¢ above Basis
Special lengths, over or under a coil	1¢ extra
Spring Twine, balls, "Extra Superior Manila"	2¾¢ above Basis
Sucker Rod Lines	Special
Tent Rope, soft laid	Basis
Tie Ropes or Halters	Special
Transmission of Power Rope, center of strands graphited—	
3 or 4-strand	4¢ above Basis
Under 500-foot lengths	5¢ above Basis
Trawl Lines or Fishing Cables	Special
Tubing Line	Special
Unoiled Cordage	1¢ above Basis
Whale Line, Special	3½¢ above Basis
Wheel Rope, 4-strand, "Extra Superior Manila"	2¢ above Basis

Quotations, unless special, refer to basis. In ordering please state whether diameter or circumference. Coast dealers and ship masters usually order by circumference; interior dealers by diameter.

Approximate Weight and Strength of Manila Rope

Diameter in Inches	Circumference in Inches	Number of Feet in One Pound	Length of Coil in Fathoms	Weight of Coil in Pounds	Working Strength Estimated in Pounds Not Guaranteed
	2-th. bale	115	1350	70	250
	3-th. bale	90	1000	70	375
	4-th. bale	66	720	70	430
3/16	6-th. fine	70	290	25	315
¼	6-thread	40	375	50	415
5/16	9-thread	35	300	50	675
⅜	12-thread	24	200	50	850
7/16	1¼	18	200	65	1,200
½	1½	14	165	70	1,680
9/16	1¾	10	135	80	1,920
⅝	2	8.1	135	100	2,400
¾	2¼	6.8	135	120	2,880
13/16	2½	5.5	135	150	3,600
⅞	2¾	4.9	135	190	4,560
1	3	3.6	125	205	5,100
1 1/16	3¼	3.1	125	240	6,000
1⅛	3½	2.7	125	276	6,900
1¼	3¾	2.3	125	324	8,100
1⅜	4	2	125	372	9,300
1 7/16	4¼	1.8	125	408	10,200
1½	4½	1.6	125	456	11,400
1 9/16	4¾	1.4	125	516	12,900
1⅝	5	1.3	125	576	14,400
1¾	5¼	1.2	125	636	15,900
1⅞	5½	1.1	125	696	17,400
1 15/16	5¾	1.	125	756	18,900
2	6	.9	125	830	20,700
2⅛	6½	.71	125	972	23,700
2¼	7	.68	125	1,140	27,900
2½	7½	.60	125	1,275	32,100
2⅝	8	.51	125	1,500	36,900
2⅞	8½	.45	125	1,700	41,700
3	9	.40	125	1,900	47,100
3⅛	9½	.36	125	2,150	52,500
3¼	10	.32	125	2,400	58,500
3⅜	10½	.30	125	2,600	64,500
3½	11	.27	125	2,900	70,800
3⅞	11½	.24	125	3,150	77,400
4	12	.22	125	3,400	84,600
4 3/16	12½	.20	125	3,700	91,800
4¼	13	.19	125	4,000	99,000
4½	13½	.18	125	4,400	107,400
4⅞	14	.16	125	4,700	115,800
4 15/16	14½	.14	125	5,000	124,200
5	15	.13	125	5,400	132,600

The working strength is estimated at 100 pounds to the thread, in a new rope. Breaking strain 50 per cent. more.

Wire Rope

CRUCIBLE CAST STEEL HOISTING ROPE

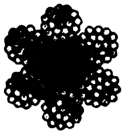


Fig. 706

The wire rope listed in the following table is the most commonly used for hoisting purposes. It is composed of six strands of nineteen wires each, or 114 wires in all, laid around a hemp center. This construction makes a very pliable rope, which will wind on moderate size drums and pass over small sheaves.

This rope is used for hoisting in mines, for cable roads, inclined planes and elevators.

Diameter in Inches	Circumference in Inches	List Price Per Foot	Approx. Weight Per Foot in Pounds	Approx. Strength in Tons of 2000 lbs.	Proper Working Load in Tons of 2000 lbs.	Diameter of Drum or Sheave in Feet Advised
¼	¾	$0.09	.10	2.20	.44	1
5/16	1	.09¼	.15	3.10	.62	1¼
⅜	1⅛	.09½	.22	4.80	.96	1½
7/16	1¼	.10	.30	6.50	1.30	1¾
½	1½	.11	.39	8.40	1.68	2
9/16	1¾	.12	.50	10.00	2.00	2¼
⅝	2	.14	.62	12.50	2.50	2½
¾	2¼	.19	.89	17.50	3.50	3
⅞	2¾	.24	1.20	23.	4.60	3½
1	3	.31	1.58	30.	6.00	4
1⅛	3½	.38	2.00	38.	7.60	4½
1¼	4	.46	2.45	47.	9.40	5
1⅜	4¼	.56	3.00	56.	11.20	5½
1½	4¾	.66	3.55	64.	12.80	6
1⅝	5	.77	4.15	72.	14.40	6½
1¾	5½	.90	4.85	85.	17.00	7
1⅞	5¾	1.02	5.55	96.	19.00	8
2	6¼	1.16	6.30	106.	21.20	8
2¼	7⅛	1.44	8.00	133.	26.60	9
2½	7⅞	1.75	9.85	170.	34.00	10
2¾	8⅝	2.10	11.95	211.	42.20	11

Add 10 per cent. to list price for wire center or galvanized rope.

EXTRA STRONG CRUCIBLE CAST STEEL HOISTING ROPE

COMPOSED OF SIX STRANDS OF NINETEEN WIRES EACH AND A HEMP CENTER

This rope is especially adapted for work where extra strength is desirable.

Diameter in Inches	Circumference in Inches	List Price Per Foot	Approx. Weight Per Foot in Pounds	Approx. Strength in Tons of 2000 lbs.	Proper Working Load in Tons of 2000 lbs.	Diameter of Drum or Sheave in Feet Advised
¼	¾	$0.10½	.10	2.43	.49	1
5/16	1	.10¾	.15	3.50	.70	1¼
⅜	1⅛	.11	.22	5.30	1.06	1½
7/16	1¼	.11½	.30	7.25	1.45	1¾
½	1½	.12½	.39	9.20	1.84	2
9/16	1¾	.14	.50	11.20	2.24	2¼
⅝	2	.16½	.62	14.00	2.80	2½
¾	2¼	.22	.89	20.20	4.04	3
⅞	2¾	.29	1.20	26.	5.20	3½
1	3	.37	1.58	34.	6.80	4
1⅛	3½	.46	2.00	43.	8.60	4½
1¼	4	.56	2.45	53.	10.60	5
1⅜	4¼	.68	3.00	64.	12.80	5½
1½	4¾	.80	3.55	73.	14.60	6
1⅝	5	.94	4.15	83.	16.60	6½
1¾	5½	1.10	4.85	99.	19.80	7
1⅞	5¾	1.25	5.55	112.	22.40	8
2	6¼	1.34	6.30	123.	24.60	8
2¼	7⅛	1.70	8.00	160.	32.00	9
2½	7⅞	2.10	9.85	200.	40.00	10
2¾	8⅝	2.55	11.95	243.	48.60	11

Add 10 per cent. to list price for wire center or galvanized rope.

Wire Rope

PLOW STEEL HOISTING ROPE

COMPOSED OF SIX STRANDS OF NINETEEN WIRES EACH AND A HEMP CENTER

This rope is especially adapted for dredges, logging, coal and ore hoisting, stump pullers, derricks, etc. These ropes are also frequently substituted in operations where the loads have been increased and where it is impossible to install larger drums and sheaves, thereby increasing the capacity of the operation 20 to 30 per cent.

Diameter in Inches	Circumference in Inches	List Price Per Foot	Approx. Weight Per Foot in Pounds	Approx. Strength in Tons of 2000 lbs.	Proper Working Load in Tons of 2000 lbs.	Diameter of Drum or Sheave in Feet Advised
¼	¾	$0.12	.10	2.65	.53	1
5/16	1	.12¼	.15	3.80	.76	1¼
⅜	1⅛	.12½	.22	5.75	1.15	1½
7/16	1¼	.13	.30	8.00	1.60	1¾
½	1½	.14	.39	10.00	2.00	2
9/16	1¾	.16	.50	12.30	2.40	2¼
⅝	2	.19	.62	15.50	3.10	2½
¾	2¼	.26	.89	23.	4.60	3
⅞	2¾	.34	1.20	29.	5.80	3½
1	3	.43	1.58	38.	7.60	4
1⅛	3½	.54	2.00	47.	9.40	4½
1¼	4	.65	2.45	58.	12.	5
1⅜	4¼	.79	3.00	72.	14.	5½
1½	4¾	.93	3.55	82.	16.	6
1⅝	5	1.08	4.15	94.	19.	6½
1¾	5½	1.30	4.85	112.	22.	7
1⅞	5¾	1.46	5.55	127.	25.	8
2	6¼	1.58	6.30	140.	28.	8
2¼	7⅛	2.00	8.00	186.	37.	9
2½	7⅞	2.50	9.85	229.	46.	10
2¾	8⅝	3.00	11.95	275.	55.	11

Add 10 per cent. to list price for wire center or galvanized rope.

SWEDES IRON HOISTING ROPE

COMPOSED OF SIX STRANDS OF NINETEEN WIRES EACH AND A HEMP CENTER

This rope is used principally for hoisting and counterweight service on elevators. In most cases it has been found advantageous to substitute steel for iron wire rope, and in making such substitution it is well to use the same size rope, thereby taking full advantage of the increased strength and wearing-capacity of steel over iron.

Diameter in Inches	Circumference in Inches	List Price Per Foot	Approx. Weight Per Foot in Pounds	Approx. Strength in Tons of 2000 lbs.	Proper Working Load in Tons of 2000 lbs.	Diameter of Drum or Sheave in Feet Advised
¼	¾	$0.06½	.10	1.10	.22	1½
5/16	1	.06¾	.15	1.50	.30	2
⅜	1⅛	.07	.22	2.40	.48	2¼
7/16	1¼	.07½	.30	2.90	.58	2¾
½	1½	.08½	.39	3.90	.78	3
9/16	1¾	.10	.50	4.70	.94	3½
⅝	2	.12	.62	6.00	1.20	4
¾	2¼	.16	.89	8.50	1.70	4½
⅞	2¾	.20	1.20	11.80	2.36	5½
1	3	.26	1.58	14.50	2.90	6
1⅛	3½	.33	2.00	18.60	3.72	7
1¼	4	.40	2.45	22.80	4.56	7½
1⅜	4¼	.49	3.00	28.	5.60	8½
1½	4¾	.57	3.55	33.	6.60	9
1⅝	5	.65	4.15	38.	7.60	10
1¾	5½	.80	4.85	44.	8.80	11
1⅞	5¾	.88	5.55	50.	10.00	12
2	6¼	.95	6.30	55.	11.00	12
2¼	7⅛	1.17	8.00	72.	14.40	14
2½	7⅞	1.40	9.85	92.	18.40	15
2¾	8⅝	1.70	11.95	111.	22.20	17

Add 10 per cent. to list price for wire center or galvanized rope.

Wire Rope

CRUCIBLE CAST STEEL TRANSMISSION AND HAULAGE ROPE

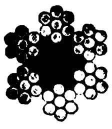


Fig. 707

This rope is composed of six strands of seven wires each, or forty-two wires in all, laid around a hemp center. Having fewer wires than hoisting rope it is much stiffer and requires larger sheaves.

It is suitable for standing rope, ferry rope, sand lines, guys, rigging, and is especially adapted for underground haulage in mines.

Diameter in Inches	Circumference in Inches	List Price Per Foot	Approx. Weight Per Foot in Pounds	Approx. Strength in Tons of 2000 lbs.	Proper Working Load in Tons of 2000 lbs.	Diameter of Drum or Sheave in Feet Advised
9/32	7/8	$0.04	.125	2.5	.50	1¾
5/16	1	.04½	.15	3.5	.70	2¼
3/8	1⅛	.05½	.22	4.6	.92	2¾
7/16	1¼	.06½	.30	5.5	1.10	3
½	1½	.08	.39	7.7	1.50	3½
9/16	1¾	.10	.50	10.0	2.00	4
⅝	2	.12	.62	13.0	2.60	4½
11/16	2⅛	.14½	.75	15.4	3.10	4¾
¾	2¼	.17	.89	18.6	3.70	5
⅞	2¾	.22½	1.20	24.	4.80	6
1	3	.29	1.58	31.	6.20	7
1⅛	3½	.36	2.00	37.	7.40	8
1¼	4	.43	2.45	46.	9.20	9
1⅜	4¼	.51	3.00	53.	10.60	10
1½	4¾	.60	3.55	63.	12.60	11

Add 10 per cent. to list price for wire center or galvanized rope.

SWEDES IRON TRANSMISSION AND HAULAGE ROPE

COMPOSED OF SIX STRANDS OF SEVEN WIRES EACH AND A HEMP CENTER

Diameter in Inches	Circumference in Inches	List Price Per Foot	Approx. Weight Per Foot in Pounds	Approx. Strength in Tons of 2000 lbs.	Proper Working Load in Tons of 2000 lbs.	Diameter of Drum or Sheave in Feet Advised
9/32	7/8	$0.03¼	.125	1.2	.24	3
5/16	1	.03¾	.15	1.7	.34	3½
3/8	1⅛	.04½	.22	2.2	.44	4
7/16	1¼	.05½	.30	2.6	.52	4½
½	1½	.06½	.39	3.7	.74	5½
9/16	1¾	.08¼	.50	4.8	.96	6
⅝	2	.10	.62	6.0	1.20	7
11/16	2⅛	.12	.75	7.3	1.50	7¼
¾	2¼	.14	.89	8.8	1.70	7½
⅞	2¾	.18½	1.20	12.	2.40	9
1	3	.24	1.58	15.	3.00	10½
1⅛	3½	.30	2.00	19.	3.80	12
1¼	4	.36	2.45	23.	4.60	13
1⅜	4¼	.43	3.00	28.	5.60	15
1½	4¾	.51	3.55	32.	6.40	16

Add 10 per cent. to list price for wire center or galvanized rope.

Galvanized Steel Wire Strand

Fig. 708

COMPOSED OF SEVEN STEEL WIRES TWISTED INTO A SINGLE STRAND

Used for guys on smokestacks, telegraph and telephone poles, for signal strand, for suspending trolley wire and as messenger strand, for span wire and other purposes.

Diameter .... inches	3/32	1/8	5/32	3/16	7/32
Approximate weight per 100 feet...... pounds	2.	3.2	5.5	7.5	9.5
Approximate strength .... "	400	500	900	1400	1800
List price.................... per 100 feet	$0.80	$1.00	$1.15	$1.25	$1.50
Diameter .... inches	1/4	5/16	3/8	7/16	1/2
Approximate weight per 100 feet...... pounds	12.5	21.	29.5	41.5	51.
Approximate strength .... "	2300	3800	5000	6500	8500
List price.................... per 100 feet	$1.75	$2.25	$2.75	$3.75	$4.50

Sash Cord

Fig. 709

COMPOSED OF SIX STRANDS OF SEVEN WIRES EACH AND A COTTON CENTER

List Price Per Foot			Diameter in Inches	Weight Per Foot in Pounds		Approximate Breaking Stress in Pounds		
Iron Annealed or Bright	Tinned or Galvanized Iron	Copper		Iron	Copper	Bright Iron	Annealed Iron	Bright Copper
$0.01¼	$0.01¾	$0.03	1/16	.006	.007	140	110	90
.01½	.02	.03½	3/32	.014	.016	320	250	200
.01¾	.02¼	.04½	1/8	.025	.029	550	425	350
.02¼	.03	.06	3/16	.056	.064	1400	1100	840
.02¾	.03½	.07½	7/32	.077	.087	1800	1411	1080
.03	.04	.09	1/4	.101	.115	2200	1650	1320

Galvanized Oval Thimbles

LOOSE

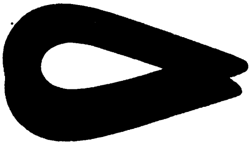


Fig. 710

Width of Score, Inches	Circumference of Rope, Inches	Price, Each	Width of Score, Inches	Circumference of Rope, Inches	Price, Each
1/4	3/4	$0.08	3/4	2¼	$0.15
5/16	1	.08	7/8	2¾	.16
3/8	1 1/8	.09	1	3	.20
7/16	1¼	.10	1 1/8	3½	.25
1/2	1½	.11	1¼	4	.33
9/16	1¾	.12	1 3/8	4¼	.42
5/8	2	.13	1½	4¾	.50

Wire Rope Clips

Diameter of Rope, Inches	Price, Each	Diameter of Rope, Inches	Price, Each	Diameter of Rope, Inches	Price, Each
1/4	$0.25	1/2	$0.30	7/8	$0.45
5/16	.25	9/16	.35	1	.50
3/8	.25	5/8	.35	1 1/8	.60
7/16	.30	3/4	.40	1¼	.65

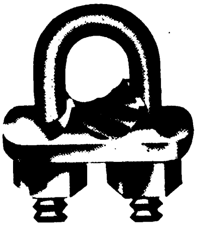


Fig. 711

Sheffield Rail Drills

Eclipse Track Drills

Track Tools

Car Movers

Picks

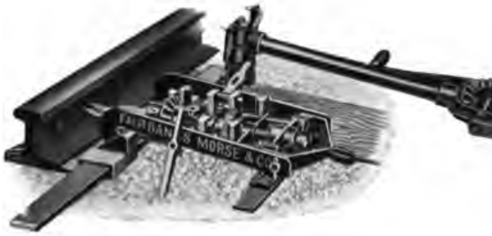
Mattocks

Shovels

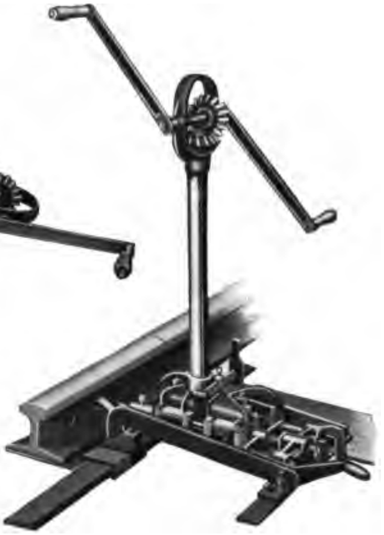
Wheelbarrows

Pages 292 to 300 Inclusive

Track Appliances



Spindle Removed
Fig. 712



Ready For Operation
Fig. 713

No. 5 SHEFFIELD RAIL DRILLS

WITH UNDER RAIL ATTACHMENT

An exclusive feature of this drill and one not possessed by any other on the market is the quick feed and return by which the drill can be quickly set up against the rail when drilling is commenced, and as quickly run back when the hole is completed.

It also has a variable speed; that is, when the regular feed for drilling is thrown in, it can be so adjusted that the feeding pawl will move the ratchet either one or two notches at a time, the adjustment being easily and quickly changed. With the under rail attachment nothing is necessary to permit the passing of trains except the removal of the spindle, which is detachable and can be removed in a few seconds, the hooks of the under rail attachment passing under instead of over the rail and engaging the rail flange. This will permit of the drill being left in position without any chance for injury by locomotive or cars passing over it.

The drill spindle has a hardened steel thrust bearing. The parts are compact and few in number. The chuck is fitted for 41/64-inch shank drills.

Weight................................	135 pounds
Price..........................	Each $30.00

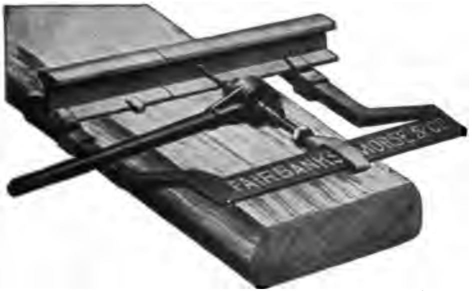


Fig. 714

ECLIPSE TRACK DRILLS

This Drill has very few parts and all encased safe from the cutting action of gravel and sand. Drills four holes at one setting. Frame slides are wrought steel. All moving parts—ratchet, pawl, brace, bit stock and drill—are of toughest tool steel. Quick acting, strong, durable. The chuck is fitted for square shank ratchet drills.

Weight	35 pounds
Price....................	Each $10.00

Track Appliances

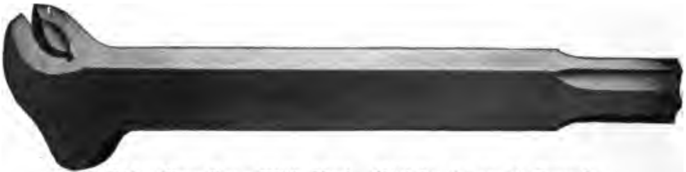


Fig. 715—Claw Bar—With Heel. Weight, 24 to 30 Pounds.

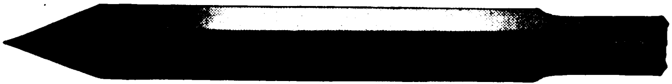


Fig. 716—Lining Bar—Diamond Point. Weight, 24 Pounds.

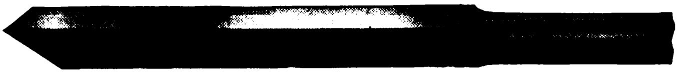


Fig. 717—Lining Bar—Pinch Point. Weight, 24 Pounds.

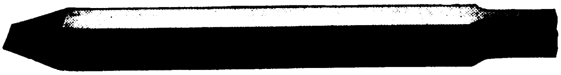


Fig. 718—Lining Bar—Wedge Point. Weight, 24 Pounds.

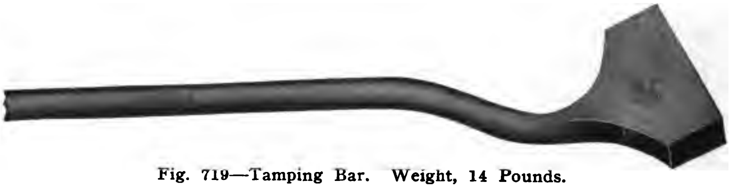


Fig. 719—Tamping Bar. Weight, 14 Pounds.

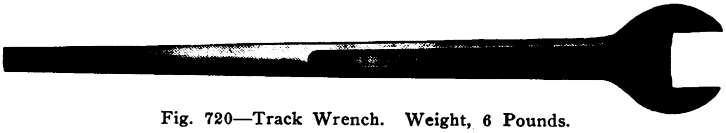


Fig. 720—Track Wrench. Weight, 6 Pounds.

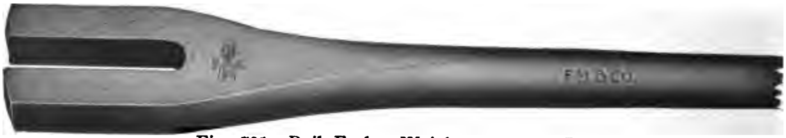
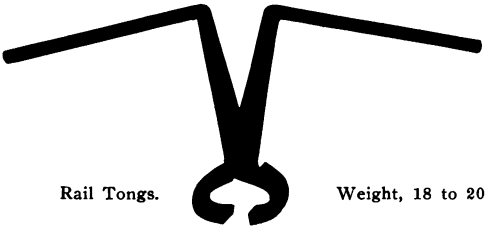


Fig. 721—Rail Fork. Weight, 13 to 15 Pounds.



Rail Tongs. Weight, 18 to 20 Pounds.

Fig. 722

Track Appliances

FAIRBANKS-MORSE DROP FORGED CLAW BARS

Are handled in the same manner as any standard claw bar—no time consumed in learning how.

Claw drop forged from crucible tool steel.

Will last longer and give better service on account of quality of material.

When claw is worn or broken, new claw can be bolted to original bar immediately, with no loss of time to working gang.

There is no strain on bolt, which is held in place by split key, therefore no bending or wearing of bolt.

One bar outwears several claws, because there is no wear on this portion of the tool.

When a claw bar of standard type wears out or is broken, it usually costs as much to repair it, if the whole bar is not scrapped, as a new claw of our pattern. You get practically a new claw bar for the cost of a claw.

This claw bar will lift any standard spike with a head, from any tie, and without bending, quicker and easier than any other bar on the market, as the leverage is at the spike.

Weight of claw bar complete......................28 pounds

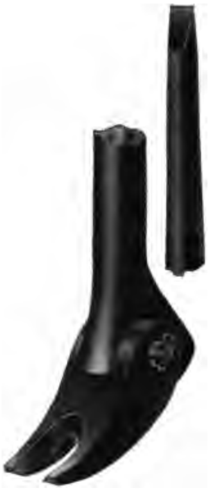
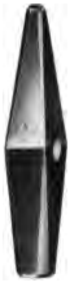
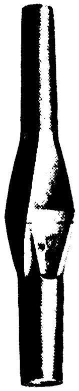


Fig. 723

SPIKE MAULS



Standard Pattern
Fig. 724



Pittsburg Pattern
Fig. 725

TRACK CHISELS

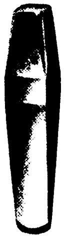
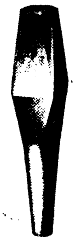
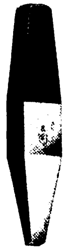


Fig. 726

TRACK PUNCHES



Round Pattern
Fig. 727



Square Pattern
Fig. 728

STANDARD PATTERN SPIKE MAULS

Weight, 8 pounds...Per pound $0.30
Weight, 10 pounds...Per pound .30

PITTSBURG PATTERN SPIKE MAULS

Weight, 8 pounds...Per pound $0.30
Weight, 10 pounds...Per pound .30

TRACK CHISELS

Weight, 5 pounds....Per pound $0.40

ROUND PATTERN TRACK PUNCHES

Weight, 5 pounds....Per pound $0.40

SQUARE PATTERN TRACK PUNCHES

Weight, 5 pounds....Per pound $0.40

Track Appliances

TRACK LEVELS

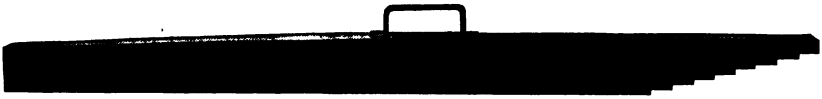


Fig. 729

Made of white pine. 1¼x5½ inches wide, 6½ feet long, with steel band, painted. Spirit glass set in top and protected by handle. One end is cut into steps and used to obtain proper elevation at curves.

Weight.................................12 pounds
Price............................Each $3.00

HUNTINGTON TRACK GAUGES

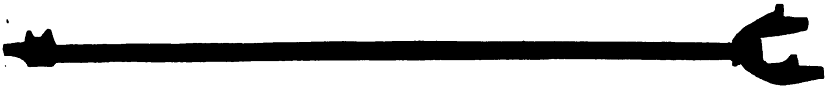


Fig. 730

Pipe stem with malleable iron prongs. One arched with double bearing on track. The other plain, with single bearing. Standard gauge, 4 feet 8½ inches between rails.

Weight.................................10 pounds
Price............................Each $3.00

JIM CROWS OR RAIL BENDERS

Forged of solid machine steel with machine steel screws.

Number	Will Bend	Weight Complete with Wrench	Price, Each
1	100 ℔. rail	225 ℔s.	$50.00
2	75 ℔. “	175 ℔s.	43.00
3	56 ℔. “	125 ℔s.	32.50
4	30 ℔. “	85 ℔s.	24.50
5	20 ℔. “	70 ℔s.	20.50

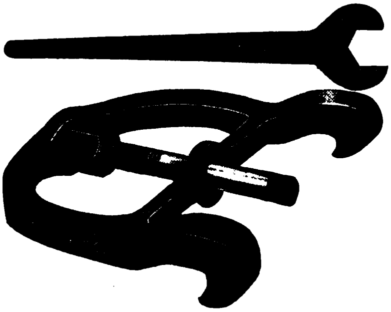


Fig. 731

SAMSON CAR MOVERS

A powerful and simple device for moving railway cars. The spur and spring are held in place by a patent clamping device. The spur can be taken out and changed from a dull to a sharp edge, or can be readily replaced with a new spur.

The best selected malleable castings and hardwood handles make it light and strong.

Weight....................15 pounds
Price.......................Each $5.00

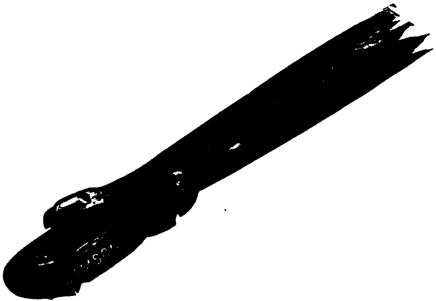


Fig. 732

Picks

RAILROAD OR CLAY PICKS

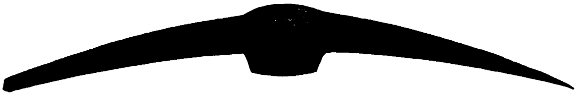


Fig. 733

ADZE EYE OIL FINISH

Made from one piece of solid steel, carefully ground, tempered and tested.

Weight Each	Per Dozen	Weight Each	Per Dozen
4 to 5 pounds	$13.00	6 to 7 pounds	$15.00
5 to 6 pounds	14.00	7 to 8 pounds	16.00

RAILROAD "V" TAMPING PICKS

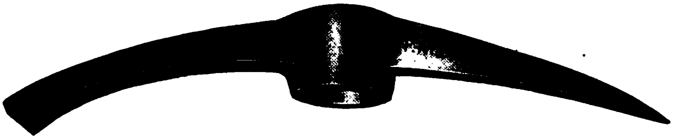


Fig. 734

ADZE EYE OIL FINISH

Made from one piece of solid steel

6 to 7 pounds........Per dozen $18.00 7 to 8 pounds........Per dozen $19.00

8 to 9 pounds........Per dozen $20.00

DRIFTING PICKS

REGULAR PATTERN

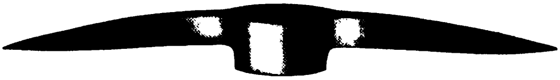


Fig. 735

ADZE EYE OIL FINISH

Made from one piece of solid steel

Size	Weight Each	Per Dozen	Size	Weight Each	Per Dozen
1	3 pounds	$12.50	3	4½ pounds	$15.00
1½	3½ pounds	13.50	4	5 pounds	16.00
2	4 pounds	14.00			

POLL PICKS

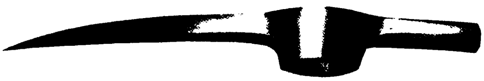


Fig. 736

ADZE EYE OIL FINISH

Made from one piece of solid steel

Size	Weight Each	Per Dozen
1	3½ pounds	$18.00
2	4 pounds	19.00
3	4½ pounds	20.00

LONG CUTTER MATTOCKS

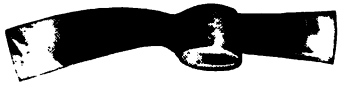


Fig. 737

JAPANNED BODY TEMPERED AND POLISHED STEEL BITS ADZE EYE

Size hoe, 8½x4½ inches. Size cutter, 6x3 inches. Average weight each, 6 pounds.

Per dozen..$17.00

Shovels

All shovels and scoops are regularly put up in bundles of one-half dozen each.

In ordering always specify figure number, grade, finish (black or polished), size number, square or round point, "D" or long handle.

Our stock comprises three grades known as:—

Extra Brand—Our first grade, made from carbon crucible steel, No. 13 gauge with XX handles.

Victor Brand—Our second grade, made from carbon open hearth steel, No. 14 gauge with X handles.

Defender Brand—Our third grade; made from carbon Bessemer steel, No. 13 gauge with No. 1 handles.

LONG HANDLE

SQUARE POINT—PLAIN BACK

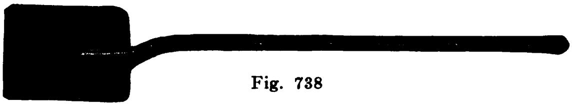


Fig. 738

Trade Number	Grade	Finish	Weight per Dozen, Pounds	Size Number	Square Point	
					Width, Inches	Length, Inches
1200	Victor	Polished	60	2	9½	11¾
1200	Victor	Polished	62	3	9¾	12¼
1200	Victor	Polished	64	4	10½	12½

LONG HANDLE, SQUARE POINT, BACK STRAP (Not Illustrated)

Trade Number	Grade	Finish	Weight per Dozen, Pounds	Size Number	Square Point	
					Width, Inches	Length, Inches
1200	Extra	Polished	68	2	9½	11¾

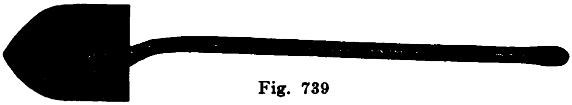


Fig. 739

LONG HANDLE

ROUND POINT—PLAIN BACK

Trade Number	Grade	Finish	Weight per Dozen, Pounds	Size Number	Round Point	
					Width, Inches	Length, Inches
1204	Extra	Polished	70	2	9¼	12¾
1204	Victor	Polished	72	2	9¼	12¾
1204	Defender	Polished	60	2	9¼	12¾

LONG HANDLE, ROUND POINT, BACK STRAP (Not Illustrated)

Trade Number	Grade	Finish	Weight per Dozen, Pounds	Size Number	Round Point	
					Width, Inches	Length, Inches
1204	Extra	Polished	70	2	9¼	12¾
1204	Extra	Black	70	2	9¼	12¾

WESTERN MINING SHOVELS

LONG HANDLE, ROUND POINT, BACK STRAP

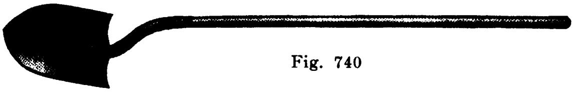


Fig. 740

Trade Number	Grade	Finish	Spring	Weight per Dozen, Pounds	Size Number	Round Point	
						Width, Inches	Length, Inches
1205	Extra	Polished	Half	72	2	9½	11¾
1205	Victor	Polished	Half	68	2	9½	11¾
1205	Victor	Polished	Full	68	2	9½	11¾

Shovels

"D" HANDLE
SQUARE POINT—PLAIN BACK

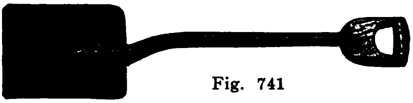


Fig. 741

Trade Number	Grade	Finish	Weight per Dozen, Pounds	Length of Handle, Inches	Size Number	Square Point	
						Width, Inches	Length, Inches
1201	Extra	Black	71	31	2	9½	11¾
1201	Extra	Polished	68	27	2	9½	11¾
1201	Victor	Polished	62	27	3	9¾	12¼
1201	Victor	Polished	64	27	4	10½	12½

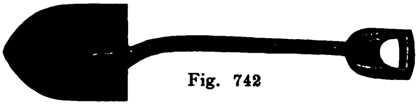


Fig. 742

"D" HANDLE
ROUND POINT—PLAIN BACK

Trade Number	Grade	Finish	Weight per Dozen, Pounds	Length of Handle, Inches	Size Number	Round Point	
						Width, Inches	Length, Inches
1203	Extra	Polished	70	27	2	9¼	12¾

"D" HANDLE, ROUND POINT, RIVETED BACK, SOCKET STRAPPED
HANDLE 4½ INCHES LONGER THAN REGULAR
(Not Illustrated)

Trade Number	Grade	Finish	Weight per Dozen, Pounds	Length of Handle, Inches	Size Number	Round Point	
						Width, Inches	Length, Inches
1203	Extra	Black	72	31½	3	9½	13¼

Scoops

"D" HANDLE
WESTERN PATTERN—HOLLOW BACK

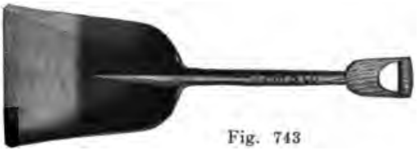


Fig. 743

Trade Number	Grade	Finish	Weight per Dozen, Pounds	Size Number	Size	
					Width, Inches	Length, Inches
1220	Eclipse	Half-Polish	....	3	12½	15
1220	Eclipse	Half-Polish	84	4	12½	15½
1220	Eclipse	Half-Polish	86	5	13½	16
1220	Eclipse	Half-Polish	88	6	13½	16½

Telegraph Spoons

PLAIN BACK—7-FOOT HANDLE

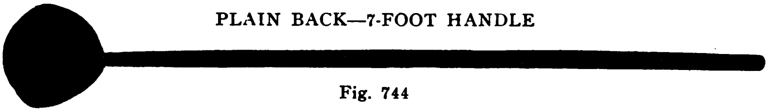
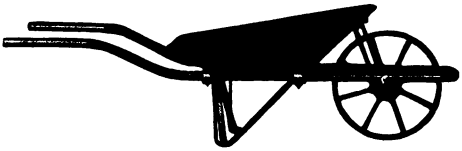


Fig. 744

Trade Number	Grade	Finish	Weight per Dozen, Pounds	Size Number	Round Point	
					Width, Inches	Length, Inches
1222	Extra	Black	84	2	9½	11¾

Wheelbarrows

TUBULAR STEEL



No. 4—Fig. 745

ADAPTED FOR MINES, MILLS, FOUNDRIES, FARMS AND RAILROADS

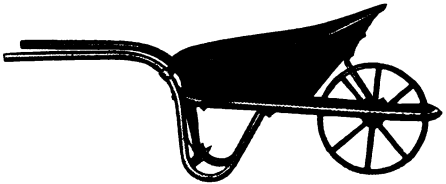
Tray pressed in one piece from a solid sheet of No. 15 gauge steel and has a flange turned over a 5/16-inch steel rod passing entirely around the tray, giving a finished appearance and strengthening it.

Tubular steel handles in one piece passing around the wheel in front, forming a wheel guard and also a rest for dumping. Equipped with patent steel wheel.

No. 4—Capacity, 3 cubic feet; greatest length, 35½ inches; greatest width, 28½ inches; greatest depth, 8½ inches; weight each, 75 pounds.

Price....................................Each $9.50

AN IDEAL TUBULAR STEEL DIRT BARROW FOR CONTRACTORS AND MINING WORK



No. 2—Fig. 746

The trays, which are of the most approved shape, are made of the best grade of steel, and have a flange turned over a 5/16-inch steel rod passing entirely around to strengthen it.

Tubular steel handles in one piece passing around the wheel. Equipped with wrought steel wheel.

No. 2—Capacity, 3½ cubic feet; greatest length, 34 inches; greatest width, 29 inches; greatest depth, 11 inches; tray of No. 15 gauge steel; weight each, 70 pounds.

Price....................................Each $10.00

Semi-Steel Wheelbarrows

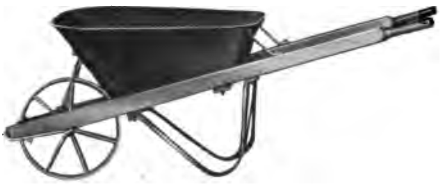


Fig. 747

CONCRETE WHEELBARROWS

(Patented)

This wheelbarrow was designed and made especially for handling concrete. In its manufacture have been introduced several patented improvements, which places this barrow superior to any other on the market for this purpose.

Attention is called to the one-piece "U" shaped wrought steel nose or yoke which holds the handles together in front of the wheel, so constructed that it serves as a wheel holder, and also as a pivot to dump the load either forward or sideways. The channel legs and braces are reinforced at all contact points. The tray is deep to prevent the concrete from spilling over the sides and capable of carrying all the material a man can wheel. The tray is supported in front by a one-piece brace, circular shaped at the top, so as to prevent the tray from sagging or tipping forward on the wheel. It is equipped with a solid malleable wheel, the lasting qualities of which are practically unlimited.

Concrete—Capacity, 4 cubic feet; greatest length, 35 inches; greatest width, 28 inches; greatest depth, 12 inches; tray of No. 15 gauge steel; selected hardwood handles; weight each, 75 pounds.

Price..Each $10.00

BANNER WHEELBARROWS

Designed along the same lines as the Concrete wheelbarrows with the exception that the braces are made in single pieces and are equipped with a wrought steel instead of a malleable wheel.

Banner—Capacity, 3½ cubic feet; greatest length, 34 inches; greatest width, 29 inches; greatest depth, 11 inches; tray of No. 15 gauge steel; selected hardwood handles; weight each, 66 pounds.

Price................Each $9.50

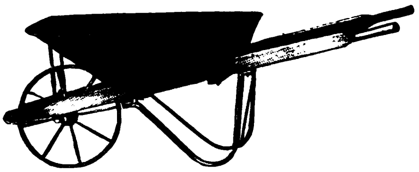


Fig. 748

Anvils
Anvil Tools
Blacksmiths' Tools
Machinists' Chisels

Vises
Hand Blowers
Portable Forges
Post Drills

Steam Blowers
Volume Blowers
Volume Exhausters
Planing Mill Exhausters

Pages 301 to 310 Inclusive

"Eagle" Anvils

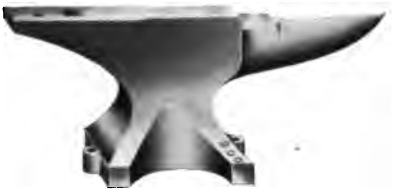


Fig. 749

The Eagle Anvil body is made of gun metal—crystallized iron—which is warranted neither to settle or break.

The face is one piece of best tool cast steel, welded on perfectly by the process of its original and only inventor. It is planed to a true surface, tempered with uniform hardness and it always remains so.

The steel horn is tough and unhardened and will not break or bend in use.

Weight, Pounds	Face			Horn	Weight, Pounds	Face			Horn
	Length, Inches	Width, Inches	Cutter Hole Square, Inches	Length, Inches		Length, Inches	Width, Inches	Cutter Hole Square, Inches	Length, Inches
50	9¼	3	⅝	6½	*150	14½	4	⅞	10
60	10	3	⅝	6½	150	15	4	⅞	10
70	10½	3¼	⅝	6½	160	15	4¼	1	10
80	10½	3¼	⅝	7½	170	15	4¼	1	10
90	11	3¼	⅝	7½	180	15½	4¼	1	10
100	12	3½	¾	8½	200	16½	4¾	1⅛	11½
110	12¾	3½	¾	8½	225	16½	4¾	1⅛	11½
120	12¾	3½	¾	8½	250	17¼	5¼	1¼	11½
130	13½	4	¾	8½	275	17¾	5¼	1¼	11½
140	14	4	⅞	8½	300	19	5¼	1¼	11½

*Horseshoers' Special. The latest pattern Horseshoers' Special Anvil has an extra solid steel clip on side of horn for toeing, at same price as the plain blacksmiths' anvil of the same weight.

Anvil Tools

TOP SWAGES

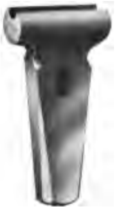


Fig. 750

BOTTOM SWAGES

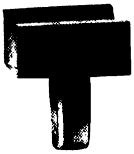


Fig. 751

TOP FULLERS

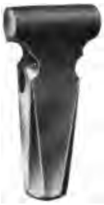


Fig. 752

BOTTOM FULLERS

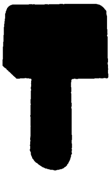


Fig. 753

Sizes, ¼ to 1¼ Inches	Sizes, ¼ to 1¼ Inches	Sizes, ¼ to ⅞ Inches	Sizes, ¼ to ⅞ Inches
Per pound........$0.42	Per pound........$0.42	Per pound........$0.42	Per pound........$0.42

SQUARE FLATTERS

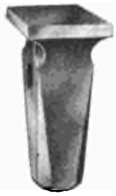


Fig. 754

SET HAMMERS

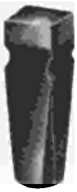


Fig. 755

HARDIES

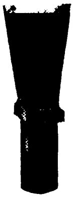


Fig. 756

ROUND PUNCHES

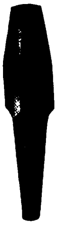


Fig. 757

SQUARE PUNCHES

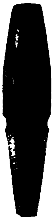


Fig. 758

Sizes, 2 to 4 Inches	Sizes, 1 to 2 Inches	Sizes, ½ to 1¼ Inches	Sizes, ⅜ to 1 Inches	Sizes, ⅜ to 1 Inches
Per pound....$0.42	Per pound....$0.42	Per pound....$0.42	Per pound....$0.42	Per pound....$0.42

Blacksmiths' Chisels

COLD CHISELS

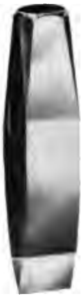


Fig. 759

HOT CHISELS

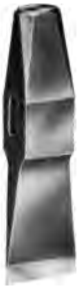


Fig. 760

SPLITTING CHISELS

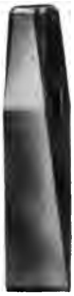
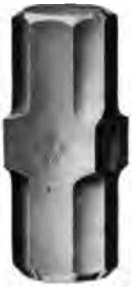


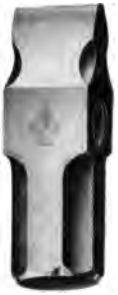
Fig. 761

Sizes, 1 to 2 Inches	Sizes, 1 to 2 Inches	Sizes, 2½ to 5 Pounds
Per pound...............$0.42	Per pound...............$0.42	Per pound...............$0.36

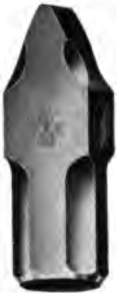
Blacksmiths' Sledges



DOUBLE FACE
Fig. 762



STRAIGHT PEIN
Fig. 763



CROSS PEIN
Fig. 764

Sizes, 8, 10, 12, 14, 16 Pounds	Sizes, 8, 10, 12, 14, 16 Pounds	Sizes, 8, 10, 12, 14, 16 Pounds
Per pound...............$0.30	Per pound...............$0.30	Per pound...............$0.30

Blacksmiths' Tongs

STRAIGHT LIP TONGS

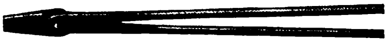


Fig. 765

BOLT TONGS

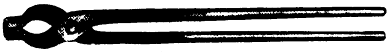


Fig. 766

STRAIGHT LIP TONGS

Length ....inches	16	18	20	22	24
Approximate weight per pair..........pounds	1¾	2	2¾	3	3¾
Price...........................per dozen	$5.60	6.00	6.80	7.60	8.40

BOLT TONGS

Length ....inches	18	18	20	20	22	22	24	24
For round iron................inches	¼	5/16	⅜	½	⅝	¾	⅞	1
Approximate weight per pair...pounds	2	2	2¼	2¼	3¼	3¼	3¾	3¾
Price......................per dozen	$9.50	9.50	10.50	10.50	12.00	12.00	13.50	13.50

PICK TONGS

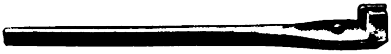


Fig. 767

Length, 22 inches. Approximate weight per pair, 4 pounds. Price per pound, $0.60

Machinists' Chisels

FORGED FROM HIGH GRADE OCTAGON TOOL STEEL
OIL TEMPERED, POLISHED FINISH HEAD AND BEVEL, NATURAL FINISH BODY

HAND COLD CHISELS

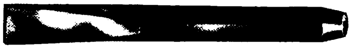


Fig. 768

CAPE CHISELS

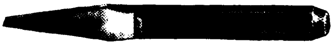


Fig. 769

HAND COLD CHISELS

Diameter of steel.............inches	¼	5/16	⅜	½	⅝	¾	⅞	1
Length ....inches	5¼	5¼	5¾	6	6⅝	7½	7¾	8
Price.....................per dozen	$2.50	2.50	2.50	....	....	....	....	....
Price.....................per pound	....	....	....	$0.40	.40	.40	.40	.40

CAPE CHISELS

When ordering, specify size of cutting edge

Cutting edge..................inches	⅛	3/16	¼	5/16	⅜	½	⅝	¾
Diameter of steel.............inches	½	½	⅝	⅝	⅝	¾	¾	⅞
Length ....inches	5½	6	7	7	7	7½	7½	7½
Price.....................per pound	$0.50	.50	.50	.50	.50	.50	.50	.50

DIAMOND POINT CHISELS

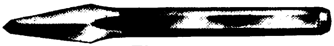


Fig. 770

ROUND NOSE CHISELS

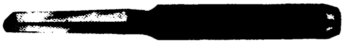


Fig. 771

DIAMOND POINT CHISELS

When ordering, specify size of point

Size of point..................................inches	¼	5/16	⅜	½
Diameter of steel..............................inches	⅝	⅝	¾	⅞
Length ....inches	7¼	7¼	7¾	8
Price.......................................per pound	$0.55	.55	.55	.55

ROUND NOSE CHISELS

When ordering, specify size of point

Size of point..................................inches	¼	5/16	⅜	½
Diameter of steel..............................inches	⅝	⅝	⅝	¾
Length ....inches	6¾	7	7	7¼
Price.......................................per pound	$0.55	.55	.55	.55

Hand Punches

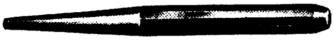


Fig. 772

SOLID FORGED STEEL, OIL TEMPERED, POLISHED FINISH POINTS, NATURAL FINISH BODY

When ordering, specify diameter of point

Diameter of point ....inches	¼	⅜	½	⅝	¾
Diameter of steel...................inches	⅝	⅝	¾	⅞	1
Length ....inches	10	10	10	10	10
Price.........................per pound	$0.40	.40	.40	.40	.40

Smith's Combination Vises

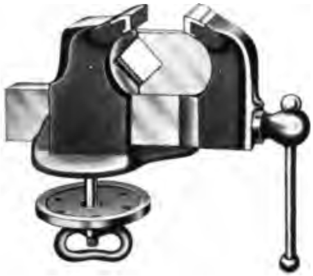


Fig. 773

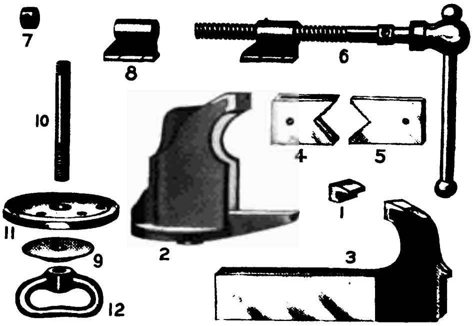


Fig. 774

Cast iron body, japanned finish. Polished slide and parallel steel-faced jaws Polished steel screw and sliding lever handle. Pipe jaws milled from tool steel and tempered in oil.

Number	1	2	3
Holds pipe ... inches	⅛ to 2	¼ to 3	¼ to 4
Weight ... pounds	47	70	100
Price ... each	$16.00	20.00	28.00

PARTS

Part Number	Name of Part	1	2	3
1	Parallel jaw ... each	$0.50	$0.50	$0.50
2	Back jaw with parallel jaw ... "	3.00	3.75	4.25
3	Front or sliding jaw with parallel jaw ... "	3.00	3.75	4.25
4	Short V pipe jaws, double ... per pair	1.25	1.75	2.25
5	Long V pipe jaw, single ... each	.75	1.00	1.25
6	Screw, nut, handle and collar ... "	1.75	2.00	2.25
7	Collar for screw ... "	.10	.10	.10
8	Nut ... "	.25	.35	.45
9	Small washer ... "	.10	.10	.10
10	Bench bolt ... "	.15	.15	.15
11	Large washer, swivel ... "	.20	.20	.20
12	Hand nut ... "	.25	.25	.25

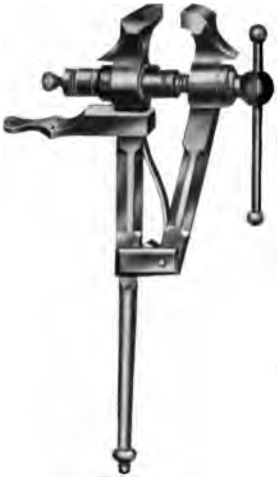


Fig. 776

Pipe Vises

Malleable iron frame, with interchangeable steel jaws. Hinged joint ,on one side to open vise. Iron latch to hold vise rigid when closed.

Number	Holds Pipe, Inches	Weight, Pounds	Price, Each
1	⅛ to 2½	16	$10.00
2	½ to 4½	30	20.00

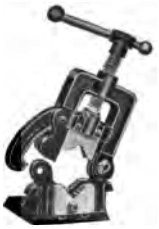


Fig. 775

Blacksmiths' Solid Box Vises

Forged steel body, japanned finish. Jaws forged from one piece of steel. Polished jaws, screw and sliding lever handle.

Number	40	50	60	75	100
Weight ... pounds	40	50	60	75	100
Width of jaws ... inches	4	4½	5	5¼	6
Jaws open ... inches	4	4½	5	5¼	6
Price ... each	$10.50	11.50	13.00	16.00	22.00

Hand Blowers

No. 200—Fig. 777

The No. 200 Silent Blower is the most practical and efficient blast producing machine on the market. No complicated bearings to run dry, cut, wear out and cause trouble. All shafts and pinions are run in long journal bearings in a solid dust and leak-proof gear case.

The same amount of gear surface is always in mesh, so that even distribution of strain is maintained. This gives a smooth, easy, noiseless rotation, without friction, wear, loose motion or back lash. The lower or high speed pinion runs in a bath of oil, lubricating all other working parts by splashing.

The fan is hung to one side of the case almost completely clearing the delivery channel, which not only increases, but insures delivery of air to the fullest capacity steadily and constantly.

No. 200—Silent Blower—12-inch fan	Each	$37.00
No. 200—Silent Blower—14-inch fan	Each	44.00
No. 200—Silent Blower—16-inch fan	Each	48.00

These prices include "Vulcan" heavy-duty tuyere iron and pipe connections.

Weight of blower, 100 pounds.

Weight of tuyere iron, 56 pounds.

Portable Forges

No. 625—Rivet Forge is the standard for railroads, ship builders, boiler makers, machine shops, bridge builders and structural iron workers.

Wherever an outdoor portable forge is required this machine will give perfect satisfaction. It requires little or no attention.

The working parts are all enclosed in a dust-proof and weather-proof case, so that it cannot suffer from exposure to the weather.

The wind shield and blower can be detached and packed in the fire pan and the legs removed for convenience in transportation and may be reassembled in a few minutes.

No. 625—18-inch fire pan, weight, 110 lbs.	Each	$35.00

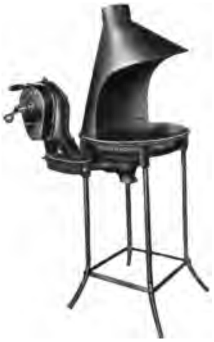
"The Rivet Forge"
No. 625—Fig. 778

No. 651—Fig. 779

No. 651—This forge is built of heavy cast iron, with careful distribution of metal at each point of strain. The iron legs are securely braced with iron straps, making the base steady and strong.

The ideal horseshoer's forge. It meets his every requirement and still has capacity to spare. It occupies but a small space and can easily be shifted to the most convenient place. Above all, it is an easy, quick heater.

No. 651—23x30-inch fire pan, complete with water tank, weight, 205 pounds	Each	$44.00
No. 651—23x30-inch fire pan, complete without water tank, weight, 195 pounds	Each	40.00



No. 131—Fig. 780

Portable Forges

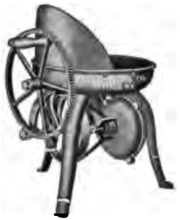
No. 131—This forge is built of heavy cast iron. The legs are rigidly braced, giving strength of support. Heavy sheet iron half hood. A good forge for toolmakers, jewelers, repairing, tempering, etc.

No. 131—22-inch fire pan, weight, 135 pounds..Each $30.00

Bench Forges

No. 7—This forge is intended for light work and is to be placed upon a bench when in use. It will produce a welding heat on 1-inch iron in 10 minutes and is especially adapted for jewelers, tinsmiths and farmers.

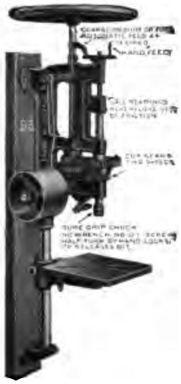
No. 7—15-inch fire pan, weight, 40 pounds....Each $16.00



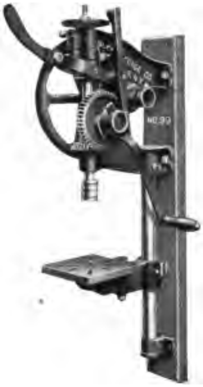
No. 7—Fig. 781

Blacksmiths' Post Drills

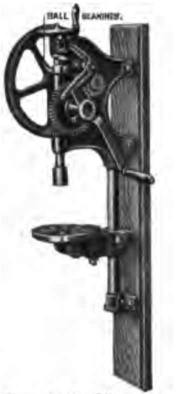
BALL-BEARING



No. 93A—Fig. 782



No. 99—Fig. 783



No. 152—Fig. 784

No. 93A—Automatic and hand feed. Ball bearing. Two speeds. Hand and power. Drills holes up to 1½ inches. Drills to center of 22-inch circle. Feed has a run of 6¼ inches. Table has a run of 21 inches. "Sure Grip" chuck bored for $^{41}/_{64}$-inch shank drills. Length over all, 66 inches. Weight, 395 pounds............Each $40.00
Tight and loose pulleys, 8x3 inches. Ordinary speed, 175 revolutions.

No. 99 —Automatic and hand feed. Ball bearing. Two speeds. For hand only. Drills holes up to 1¼ inches. Drills to center of 15½-inch circle. Feed has a run of 3 inches. Table has a run of 12 inches. "Sure Grip" chuck bored for $^{41}/_{64}$-inch shank drills. Length over all, 40 inches. Weight, 125 pounds............Each $18.00

No. 152—Automatic and hand feed. Ball bearing. Three speeds. For hand only. Drills holes up to 1¼ inches. Drills to center of 14-inch circle. Feed has a run of 3 inches. Table has a run of 12 inches. "Improved" chuck bored for $^{41}/_{64}$-inch shank drills. Length over all, 38 inches. Weight, 80 pounds.............Each $10.00

Star Steam Blowers

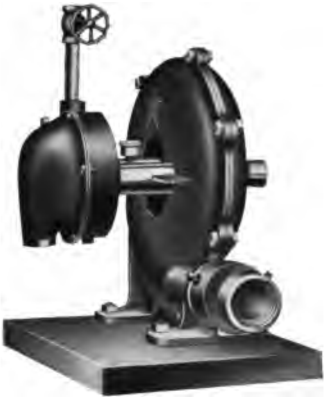


Fig. 785

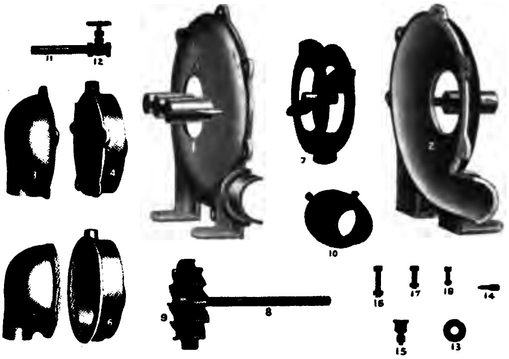


Fig. 786

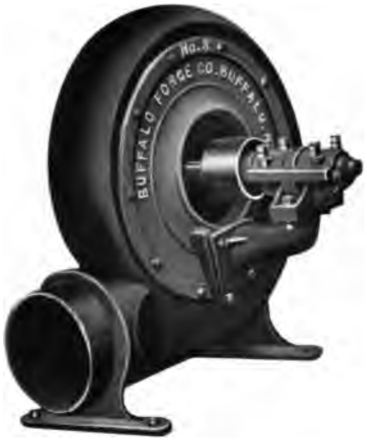
These blowers are strong and durable. No belts or pulleys. Require but a small jet of steam or compressed air to operate them. May be placed in any position and operated by simply connecting to a boiler or compressor. The blast is regulated by the globe valve.

Number	3	4	7
Weight .... pounds	75	100	240
Outlet .... inches	3¼	4⅜	6¼
Threaded for pipe .... inches	2	3	4
Price .... each	$30.00	40.00	90.00

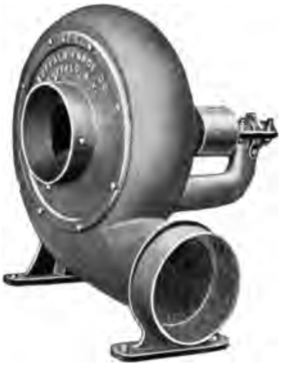
PARTS

Part Number	Name of Part	3	4	7
1	Side for cage........each	$6.50	$8.50	$19.00
2	Plain side .... "	5.00	6.50	14.50
3	Funnel for cage, to bolt on........ "	2.50	3.50	8.00
4	Cage, to bolt on .... "	3.50	5.00	14.00
5	Funnel for cage, to screw on........ "	2.50	....	.....
6	Cage, to screw on .... "	3.50	....	.....
7	Fan .... "	2.50	3.50	8.00
8	Shaft .... "	1.50	2.00	4.50
9	Brass jet wheel .... "	6.50	8.00	18.00
10	Blast nozzle with set screws........ "	1.50	2.50	5.50
11	Nipple .... "	.20	.30	.60
12	Valve .... "	.80	1.30	2.00
13	Washer .... "	.10	.10	.10
14	Brass jet .... "	.80	1.00	1.50
15	Grease cups .... "	.50	.50	.50
16	Bolts for plank, (4)........ "	.10	.10	.10
17	Bolts for sides, (6)........ "	.10	.10	.10
18	Bolts for cage, (5)........ "	.10	.10	.10

Buffalo "B" Volume Blowers and Exhausters



VOLUME BLOWER
RIGHT HAND, BOTTOM HORIZONTAL DISCHARGE
Fig. 787



VOLUME EXHAUSTER
RIGHT HAND, BOTTOM HORIZONTAL DISCHARGE
Fig. 788

The shell and brackets of these Blowers and Exhausters are cast-iron, amply strong, smoothly finished and graceful in outline. The detachable side plates are of such diameter as to permit the removal of the wheel through the side of the shell.

The bearings are long, self-oiling, self-aligning in every direction, and finely finished.

The wheel is given a running balance, being perfectly smooth and quiet in operation.

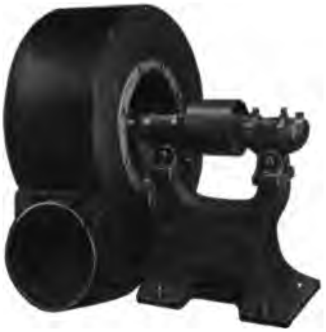
The Blowers are useful wherever a large volume of air at moderate pressure is desired, hence are applicable for creating forced draft for boilers, bagasse furnaces, hollow-blast grates, garbage furnaces, tan bark and refuse burning, forge fires and heating furnaces, producer gas plants, etc.

The Exhausters are especially adapted to handling gritty dust, such as comes from emery wheels, grinding and buffing hoods, tumbling barrels, and rattlers; also for the removal of smoke from forge fires, steam from cooking vats or kettles, and for exhaust ventilation of offices, toilet rooms, and underground passages. They are constructed with special wheel of non-corrosive material for handling fumes and gases common to chemical works, varnish factories, refineries, and laboratories.

Trade Number	Price, Each	Outlet of Blower, Inches	Inlet of Exhauster, Inches	Outlet of Exhauster, Inches	Pulley		Weight of Blower, Pounds	Weight of Exhauster, Pounds
					Diameter, Inches	Face, Inches		
1	$20.00	4⅞	5¾	4⅞	3	2½	55	60
2	25.00	6 1/16	6 1/16	6 1/16	3¼	2⅝	95	100
3	33.00	7⅝	7½	7⅝	4	3¼	155	170
4	44.00	9	9	9	5	4	190	200
5	55.00	10⅝	10⅝	10⅝	5¾	4½	265	275
6	70.00	11	12⅛	11	6½	5½	365	380
7	90.00	14	14	14	7½	6½	550	575
8	150.00	16⅜	16	16⅜	8½	7½	700	725
9	200.00	17⅞	17¼	17⅞	9½	8½	1050	1100
10	250.00	21	21	21	12	10	1600	1600
11	350.00	24½	24½	24½	14	12	3200	3200

Trade number, price, and pulley dimensions refer to either Blower or Exhauster.

Buffalo Steel Plate Planing Mill Exhausters



Right Hand, Bottom Horizontal Discharge
Fig. 789

These Exhausters have a reversible housing, adjustable to either hand and to any direction of discharge. All the adjustments are made in a few minutes and on the outside of the housing.

To change the direction of discharge, loosen the eight bolts in the ring of each pedestal; then revolve the housing until the discharge points in the desired direction.

To change the hand, remove these bolts, loosen the set screws holding the fan to the shaft, then shift the pedestals. This operation is quickly and easily done.

The advantages of this fan are self evident. In one fan is the ability to meet any requirement, be it of hand or of discharge. Eliminates any necessity for crossed belts and avoids all sharp angles.

To users this is desirable because it is frequently necessary to change the position of the fan, due to alterations or enlargement of the building. The fan can quickly be adjusted to the new position and meets the requirements equally to a fan built for the place.

The inlet and bearing pedestals are of heavy cast iron, reinforced by a proper distribution of metal at every point of strain.

The journals, five diameters in length, lined with babbitt metal, have two chambers for the oil rings. These rings constantly carry oil around the shaft. It is impossible for the bearings to be without lubrication as long as there is oil in the chambers.

Trade Number	Width of Fan, Inches	Outside Diameter of Inlet, Inches	Outside Diameter of Outlet, Inches	Pulley		Weight, Pounds	Price, Each
				Diameter, Inches	Face, Inches		
30	32¼	12	12	6	4½	325	$55.00
35	36¼	14	14	7	5½	420	70.00
40	39⅝	16	16	8	6½	590	90.00
45	43½	18	18	9	7½	745	115.00
50	47¼	20	20	10	8½	1025	150.00
55	51	22	22	11	9½	1175	185.00
60	54	24	24	12	10½	1525	200.00
70	60¾	28	28	14	11½	1810	250.00
80	64¾	32	32	16	12½	2100	300.00

Buffalo Double Fan Steel Plate Planing Mill Exhausters can be furnished on special orders for factory shipment. Prices upon application.

TABLE OF SPEEDS, CAPACITIES AND HORSE POWER

Trade Number	One Ounce			Two Ounce			Three Ounce		
	R. P. M.	Capacity	H. P.	R. P. M.	Capacity	H. P.	R. P. M.	Capacity	H. P.
30	1025	1650	.90	1450	2340	2.55	1775	2850	4.65
35	890	2300	1.25	1260	3250	3.53	1540	3975	6.48
40	770	3000	1.63	1090	4250	4.60	1334	5190	8.40
45	690	3825	2.08	976	5410	5.95	1195	6620	10.78
50	622	4750	2.58	880	6720	7.28	1078	8220	13.38
55	570	5750	3.12	806	8120	8.83	987	9950	16.25
60	520	6900	3.75	735	9750	10.60	900	11950	19.50
70	450	9400	5.10	637	13300	14.50	780	16300	26.60
80	390	12200	6.63	552	17280	18.75	676	21200	34.50

Trade Number	Four Ounce			Five Ounce			Six Ounce		
	R. P. M.	Capacity	H. P.	R. P. M.	Capacity	H. P.	R. P. M.	Capacity	H. P.
30	2050	3300	7.20	2290	3680	10.05	2510	4040	13.32
35	1780	4600	10.00	1990	5140	13.92	2180	5630	18.35
40	1540	6000	13.00	1722	6700	18.15	1888	7350	23.85
45	1380	7650	16.60	1542	8550	23.20	1690	9350	30.40
50	1245	9500	20.60	1391	10600	28.80	1525	11620	37.90
55	1140	11500	25.00	1275	12850	34.90	1398	14080	45.80
60	1040	13800	30.00	1162	15400	41.90	1273	16900	55.00
70	900	18800	40.90	1005	21000	56.90	1100	23000	75.00
80	780	24400	53.00	872	27300	74.00	956	29850	97.20

Twist Drills
Sockets, Sleeves, Etc.
Ratchets
Drilling Posts

Taps
Countersinks
Reamers
Screwplates

Stocks and Dies
Pipe Machines
Pipe Cutters
Pipe Tongs

Wrenches
Pliers
Snips
Soldering Coppers

Fire Pots
Torches
Cant Hooks, Peavies, Etc.

Pages 311 to 330 Inclusive

Twist Drills

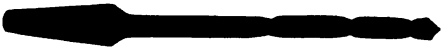


Fig. 790

No. 114—BIT STOCK—FOR METAL OR WOOD

These Bit Stock Drills will fit any brace on the market, and will drill steel, iron, or other metals, as well as wood. They are not injured by contact with screws or nails, and will bore any kind of wood without splitting it.

Diameter, Inches	Price, Per Dozen	Price, Each	Length Over All, Inches	Diameter, Inches	Price, Per Dozen	Price, Each	Length Over All, Inches	Diameter, Inches	Price, Per Dozen	Price, Each	Length Over All, Inches
1/16	$1.50	$0.14	3 9/16	19/64	$5.05	$0.46	5 1/2	23/32	$19.15	$1.60	7 1/2
5/64	1.60	.15	4	5/16	5.40	.48	5 1/2	3/4	19.75	1.65	7 1/2
3/32	1.65	.16	4	21/64	5.85	.51	5 3/4	25/32	20.95	1.75	7 1/2
7/64	1.90	.18	4	11/32	6.30	.54	5 3/4	13/16	21.55	1.80	7 1/2
1/8	2.10	.20	4	3/8	7.20	.62	6	27/32	22.75	1.90	7 1/2
9/64	2.35	.22	4 1/4	13/32	8.00	.68	6 1/4	7/8	23.35	1.95	7 1/2
5/32	2.60	.24	4 1/4	7/16	8.80	.75	6 1/2	29/32	24.55	2.05	7 1/2
11/64	2.85	.26	4 1/2	15/32	9.60	.82	6 3/4	15/16	25.75	2.15	7 1/2
3/16	3.10	.29	4 1/2	1/2	10.30	.87	7	31/32	26.95	2.25	7 1/2
13/64	3.35	.31	4 3/4	17/32	11.00	.92	7 1/4	1	28.15	2.35	7 1/2
7/32	3.60	.33	4 3/4	9/16	14.35	1.20	7 1/2	1 1/16	35.95	3.00	7 1/2
15/64	3.85	.36	5	19/32	15.55	1.30	7 1/2	1 1/8	40.15	3.35	7 1/2
1/4	4.10	.38	5	5/8	16.15	1.35	7 1/2	1 3/16	43.15	3.60	7 1/2
17/64	4.40	.41	5 1/4	21/32	17.35	1.45	7 1/2	1 1/4	44.95	3.75	7 1/2
9/32	4.70	.43	5 1/4	11/16	17.95	1.50	7 1/2				

FOR BLACKSMITHS' DRILL PRESSES

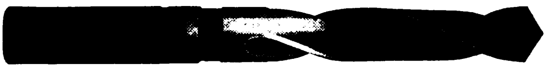


Fig. 791

No. 116—BLACKSMITHS'—SHANKS 2¼ INCHES LONG

Shanks are .648-inch exact diameter—commonly called ⅝-inch
Round with One Flat Side

No. 116—CARBON STEEL DRILLS No. 431—HIGH SPEED DRILLS

Diameter, Inches	Price Each		Length Over All, Inches	Diameter, Inches	Price Each		Length Over All, Inches	Diameter, Inches	Price Each		Length Over All, Inches
	Carbon Steel	High Speed			Carbon Steel	High Speed			Carbon Steel	High Speed	
1/8	$0.55	....	4 7/8	19/32	$1.03	$2.20	6	1 1/16	$2.00	$4.50	6
5/32	.58	....	4 7/8	5/8	1.05	2.30	6	1 3/32	2.10	4.75	6
3/16	.60	....	5 5/8	21/32	1.10	2.40	6	1 1/8	2.20	5.00	6
7/32	.65	....	5 5/8	11/16	1.15	2.50	6	1 5/32	2.25	5.25	6
1/4	.70	$1.20	6	23/32	1.20	2.65	6	1 3/16	2.30	5.50	6
9/32	.73	1.30	6	3/4	1.25	2.75	6	1 7/32	2.35	5.80	6
5/16	.75	1.40	6	25/32	1.30	2.90	6	1 1/4	2.40	6.10	6
11/32	.80	1.50	6	13/16	1.35	3.00	6	1 9/32	2.50	6.40	6
3/8	.85	1.55	6	27/32	1.40	3.15	6	1 5/16	2.60	6.70	6
13/32	.88	1.65	6	7/8	1.45	3.30	6	1 11/32	2.70	7.00	6
7/16	.90	1.70	6	29/32	1.55	3.50	6	1 3/8	2.80	7.40	6
15/32	.93	1.80	6	15/16	1.60	3.70	6	1 13/32	2.90	7.80	6
1/2	.95	1.85	6	31/32	1.70	3.90	6	1 7/16	3.00	8.20	6
17/32	.98	1.95	6	1	1.80	4.10	6	1 15/32	3.10	8.60	6
9/16	1.00	2.05	6	1 1/32	1.90	4.30	6	1 1/2	3.20	9.00	6

High Speed Drills with ⅝-inch shank will be furnished in sizes over ¾-inch diameter only at customer's risk, as we do not consider the shanks strong enough.

Twist Drills

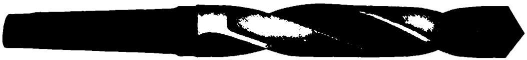


Fig. 792

No. 106—TAPER SHANK—USED WITH SOCKET OR SLEEVE

No. 106—CARBON STEEL DRILLS No. 403—HIGH SPEED DRILLS

Diameter, Inches	Price Each		Length Over All, Inches	Shank Taper	Diameter, Inches	Price Each		Length Over All, Inches	Shank Taper	Diameter, Inches	Price Each		Length Over All, Inches	Shank Taper
	Carbon Steel	High Speed				Carbon Steel	High Speed				Carbon Steel	High Speed		
1/8	$0.45	$0.90	5 1/8	No. 1	3/4	$1.85	$3.50	9 3/4	No. 2	1 3/8	$5.20	$13.75	14 1/2	No. 4
5/32	.45	.90	5 3/8		25/32	2.00	3.75	9 7/8		1 13/32	5.40	14.65	14 5/8	
3/16	.50	.90	5 5/8		13/16	2.15	4.00	10		1 7/16	5.60	15.50	14 3/4	
7/32	.55	1.00	5 7/8		27/32	2.30	4.40	10 1/4		1 15/32	5.80	16.40	14 7/8	
1/4	.60	1.10	6 1/8		7/8	2.45	4.75	10 1/2		*1 1/2	6.00	17.25	15	
9/32	.65	1.20	6 1/4		29/32	2.60	5.15	10 5/8		1 17/32	6.30	18.15	15 1/8	
5/16	.70	1.30	6 3/8							1 9/16	6.60	19.00	15 1/4	
11/32	.75	1.40	6 1/2		15/16	2.75	5.50	10 3/4	No. 3	1 19/32	6.90	20.00	15 3/8	
3/8	.80	1.50	6 3/4		31/32	2.90	5.90	10 7/8		1 5/8	7.20	21.00	15 1/2	
13/32	.85	1.65	7		1	3.00	6.25	11		1 21/32	7.50	22.00	15 5/8	
7/16	.90	1.75	7 1/4		1 1/32	3.20	6.75	11 1/8		1 11/16	7.80	23.00	15 3/4	
15/32	.95	1.90	7 1/2		1 1/16	3.40	7.25	11 1/4		1 23/32	8.10	24.00	15 7/8	
1/2	1.00	2.00	7 3/4		1 3/32	3.60	7.75	11 1/2		1 3/4	8.40	25.00	16	
17/32	1.10	2.15	8		1 1/8	3.80	8.25	11 3/4		1 25/32	8.60	26.25	16 1/8	
9/16	1.20	2.25	8 1/4		1 5/32	4.00	8.90	11 7/8		1 13/16	8.80	27.50	16 1/4	
					1 3/16	4.20	9.50	12		1 27/32	9.00	28.75	16 3/8	
19/32	1.30	2.40	8 1/2	No. 2	1 7/32	4.40	10.15	12 1/8		1 7/8	9.20	30.00	16 1/2	
5/8	1.40	2.50	8 3/4		1 1/4	4.50	10.75	12 1/2		1 29/32	9.35	31.25	16 1/2	
21/32	1.50	2.75	9							1 15/16	9.50	32.50	16 1/2	
11/16	1.60	3.00	9 1/4		1 9/32	4.65	11.50	14 1/8	No. 4	1 31/32	9.65	33.75	16 1/2	
23/32	1.70	3.25	9 1/2		1 5/16	4.80	12.25	14 1/4		2	9.80	35.00	16 1/2	
					1 11/32	5.00	13.00	14 3/8						

Prices on larger sizes quoted upon application.
Sixty-fourth sizes furnished at the price of the next larger size.
*Discount changes at 1 1/2-inch diameter.

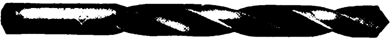


Fig. 793

No. 108—STRAIGHT SHANK—SHORT SET

JOBBERS' AND MACHINISTS' SETS

No. 108—CARBON STEEL DRILLS No. 417—HIGH SPEED DRILLS

Diameter, Inches	Price per Dozen		Length Over All, Inches	Diameter, Inches	Price per Dozen		Length Over All, Inches	Diameter, Inches	Price per Dozen		Length Over All, Inches
	Carbon Steel	High Speed			Carbon Steel	High Speed			Carbon Steel	High Speed	
1/16	$1.00	$12.00	2 1/2	7/32	$2.65	$7.35	3 3/4	3/8	$5.40	$13.50	5
5/64	1.10	10.00	2 5/8	15/64	2.90	7.35	3 7/8	25/64	5.70	15.00	5 1/8
3/32	1.20	9.00	2 3/4	1/4	3.15	7.35	4	13/32	6.00	15.00	5 1/4
7/64	1.30	9.00	2 7/8	17/64	3.40	9.10	4 1/8	27/64	6.40	17.00	5 3/8
1/8	1.45	8.50	3	9/32	3.65	9.10	4 1/4	7/16	6.80	17.00	5 1/2
9/64	1.60	8.50	3 1/8	19/64	3.90	10.50	4 3/8	29/64	7.20	18.75	5 5/8
5/32	1.80	7.50	3 1/4	5/16	4.20	10.50	4 1/2	15/32	7.50	18.75	5 3/4
11/64	2.00	7.50	3 3/8	21/64	4.50	12.00	4 5/8	31/64	7.75	20.00	5 7/8
3/16	2.20	6.50	3 1/2	11/32	4.80	12.00	4 3/4	1/2	8.00	20.00	6
13/64	2.40	7.35	3 5/8	23/64	5.10	13.50	4 7/8				

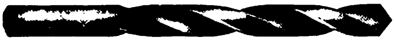


Fig. 794

No. 108A—WIRE GAUGE DRILLS

No. 108A—CARBON STEEL DRILLS No. 418—HIGH SPEED DRILLS

Wire Gauge Number	Price per Dozen		Wire Gauge Number	Price per Dozen		Wire Gauge Number	Price per Dozen	
	Carbon Steel	High Speed		Carbon Steel	High Speed		Carbon Steel	High Speed
1 to 5	$2.35	$7.35	21 to 22	$1.75	$7.50	41	$1.10	$9.00
6 to 10	2.25	7.35	23 to 25	1.75	8.50	42 to 45	1.10	10.00
11 to 12	2.10	7.35	26 to 30	1.55	8.50	46 to 47	.95	10.00
13 to 15	2.10	7.50	31 to 35	1.40	9.00	48 to 52	.95	12.00
16 to 20	1.95	7.50	36 to 40	1.25	9.00	53 to 60	.95	....

We do not carry in stock High Speed Wire Gauge Drills, as we consider their use is of doubtful economy. We do not recommend them in sizes smaller than No. 19.

Twist Drills

Fig. 795

No. 111—SQUARE SHANK RATCHET DRILLS

No. 111—CARBON STEEL DRILLS No. 414—HIGH SPEED DRILLS

Diameter, Inches	Price Each		Length Over All, Inches	Diameter, Inches	Price Each		Length Over All, Inches	Diameter, Inches	Price Each		Length Over All, Inches
	Carbon Steel	High Speed			Carbon Steel	High Speed			Carbon Steel	High Speed	
⅛	$0.90	....	4½	19/32	$1.40	$3.10	6½	1 1/16	$2.85	$6.00	8½
5/32	.95	....	4½	⅝	1.40	3.20	6½	1 3/32	3.00	6.30	8½
3/16	.95	.....	4½	21/32	1.45	3.30	6½	1⅛	3.10	6.70	9
7/32	1.00	....	5	11/16	1.45	3.40	6½	1 5/32	3.25	7.00	9
¼	1.00	$2.50	5	23/32	1.50	3.50	6½	1 3/16	3.35	7.30	9
9/32	1.05	2.55	5	¾	1.55	3.65	6½	1 7/32	3.50	7.60	9
5/16	1.10	2.60	5	25/32	1.65	3.80	6½	1¼	3.65	7.90	9
11/32	1.15	2.65	5	13/16	1.75	4.00	7	1 9/32	3.75	8.25	9
⅜	1.20	2.70	6	27/32	1.90	4.20	7	1 5/16	3.90	8.60	9
13/32	1.25	2.75	6¼	⅞	2.05	4.50	7½	1 11/32	4.05	9.00	9
7/16	1.25	2.80	6¼	29/32	2.20	4.70	7½	1⅜	4.20	9.40	9
15/32	1.30	2.85	6¼	15/16	2.30	5.00	8	1 13/32	4.35	9.80	9
½	1.30	2.90	6½	31/32	2.40	5.25	8	1 7/16	4.50	10.20	9
17/32	1.35	2.95	6½	1	2.55	5.50	8½	1 15/32	4.65	10.60	9
9/16	1.35	3.00	6½	1 1/32	2.70	5.75	8½	1½	4.80	11.00	9

No. 1 Shanks—⅜-inch by ⅝-inch by 1½-inches long. No. 2 Shanks—½-inch by ¾-inch by 1¾-inches long. Unless otherwise specified, No. 1 Shank will be furnished, except on high speed drills over 1-inch, which will be equipped with No. 2 Shank.

Steel Sockets for Taper Shank Drills

No. 100—ROUGH—Fig. 796

No. 102—FITTED—Fig. 797

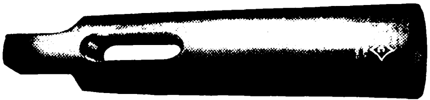
No. 100—ROUGH—FINISHED HOLE TO FIT TAPER SHANK DRILLS

Size Number	For Taper Shank Drills	Length Over All, Inches	Diameter of Shank, Inches	Price, Each
1	¼-inch to 9/16-inch	7½	1⅛	$1.20
2	19/32-inch to 29/32-inch	8	1¼	1.80
3	15/16-inch to 1¼-inch	10	1½	2.50
4	1 9/32-inch to 2-inch	12½	2	4.00

No. 102—FITTED—FINISHED HOLE TO FIT TAPER SHANK DRILLS

Size Number	For Taper Shank Drills	Hole Number	Shank Number	Price, Each
1	⅛-inch to 37/64-inch	1	2	$2.00
2	19/32-inch to 29/32-inch	2	3	2.50
3	59/64-inch to 1¼-inch	3	4	3.20
4	1 17/64-inch to 2-inch	4	5	4.80

Steel Sleeves or Shell Sockets



No. 104—Fig. 798

A BUSHING TO MAKE SHANKS FIT LARGER SPINDLES OR SOCKETS TAKE SMALLER DRILLS

Size Number	For Taper Shank Drills	Hole Number	Shank Number	Price, Each
1	⅛-inch to 37/64-inch	1	2	$1.80
2	19/32-inch to 29/32-inch	2	3	2.40
3	59/64-inch to 1¼-inch	3	4	3.00
4	1 17/64-inch to 2-inch	4	5	4.40

Drifts or Center Keys

DROP FORGED AND HARDENED

Fig. 799

	Each
No. 1—For No. 1 Sockets and Sleeves	$0.30
No. 2—For No. 2 Sockets and Sleeves	.35
No. 3—For No. 3 Sockets and Sleeves	.40
No. 4—For No. 4, 5 and 6 Sockets and Sleeves	.50

Drill Holders

FOR STRAIGHT SHANK DRILLS

Fig. 800

With shanks 41/64-inch diameter
Little Giant—For holding drills ⅛, 5/32, 3/16, 7/32, ¼, 9/32, 5/16, 11/32, ⅜, 13/32, 7/16, 15/32 .... Each $0.70
A Holder is required for each size drill.

"Monarch" Square Sleeve Ratchets

SINGLE ACTING
FOR SQUARE SHANK RATCHET DRILLS ONLY

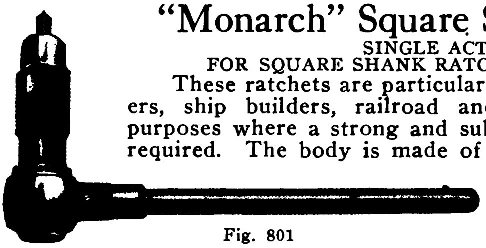


Fig. 801

These ratchets are particularly adapted to the use of bridge builders, ship builders, railroad and iron construction work, and all purposes where a strong and substantial single-acting ratchet drill is required. The body is made of drop-forged steel, sockets of forged steel, and handle of solid bar steel. Wearing parts are hardened and durable. Hexagon feed nut with extra heavy screw.

Number	10	20	30	40	50	60	70
Length of handle ..... inches	10	12	15	18	22	24	28
Height of head ..... "	5⅝	7⅞	7⅞	8¾	8¾	8¾	8¾
Price ..... each	$5.00	5.50	6.00	7.50	8.50	9.00	10.00

"Monarch" Boiler Ratchets

SINGLE ACTING
FOR SQUARE SHANK RATCHET DRILLS ONLY

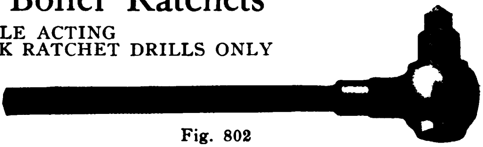


Fig. 802

Number	210	220	230	240	250	260	270
Length of handle ..... inches	10	12	15	18	22	24	28
Height of head ..... "	3⅝	4¾	4¾	5⅜	5⅜	5⅜	5⅜
Price ..... each	$4.25	4.75	5.50	7.50	8.50	9.00	10.00

Both style ratchets up to and including 15 inches take square shank ratchet drills with No. 1 shanks, ⅝x⅝x1½ inches. On all larger sizes No. 2 shanks, ½x¾x1¾ inches.

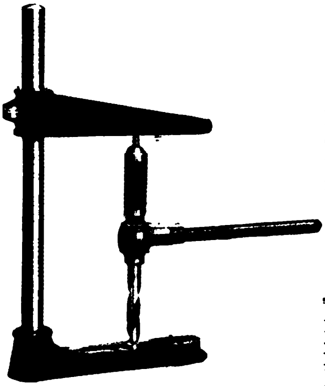


Fig. 803

Drilling Post or "Old Man"

FOR USE WITH RATCHETS

By the use of the drilling post many hours of labor can be saved where users of ratchets have to devise means or methods of bracing their ratchets for various classes of work. The drilling post is a necessity in almost all classes of drilling.

Foot and arm made of the best quality malleable iron, and post of solid steel.

Top and bottom of foot planed true and slotted for bolting down.

Number	1	2
Height of post ..... inches	20	26
Radius of arm ..... "	10	12
Price ..... each	$8.00	10.00

Machinists' Hand Taps

Taper—Fig. 804

Plug—Fig. 805

Bottoming—Fig. 806

Diameter, Inches	Number of Threads Per Inch: United States Standard	"V" Form	Length Over All, Inches	Price, Each	Price, Per Set	Diameter, Inches	Number of Threads Per Inch: United States Standard	"V" Form	Length Over All, Inches	Price, Each	Price, Per Set
3/16	30	24	2 3/8	$0.35	$1.05	7/8	9	9	4 11/16	$1.60	$4.80
1/4	20	20	2 1/2	.45	1.35	15/16	9	9	4 29/32	1.80	5.40
5/16	18	18	2 23/32	.50	1.50	1	8	8	5 1/8	2.00	6.00
3/8	16	16	2 15/16	.55	1.65	1 1/16	8	8	5 1/8	2.15	6.45
7/16	14	14	3 5/32	.60	1.80	1 1/8	7	7	5 7/16	2.25	6.75
1/2	13*	12	3 3/8	.70	2.10	1 3/16	7	7	5 7/16	2.45	7.35
9/16	12	12	3 19/32	.80	2.40	1 1/4	7	7	5 3/4	2.60	7.80
5/8	11	11	3 13/16	.90	2.70	1 5/16	7	7	5 3/4	2.80	8.40
11/16	11	11	4 1/32	1.05	3.15	1 3/8	6	6	6 1/16	3.00	9.00
3/4	10	10	4 1/4	1.20	3.60	1 7/16	6	6	6 1/16	3.25	9.75
13/16	10	10	4 15/32	1.40	4.20	1 1/2	6	6	6 3/8	3.50	10.50

*Can also be furnished with 12 threads per inch.

In ordering, state if Exact or Oversize Taps are wanted, also whether United States Standard or "V" Form thread is wanted.

Machine or Nut Taps

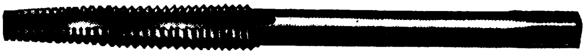


Fig. 807

Diameter, Inches	Number of Threads Per Inch: United States Standard	"V" Form	Length of Thread, Inches	Length Over All, Inches	Price, Each	Diameter, Inches	Number of Threads Per Inch: United States Standard	"V" Form	Length of Thread, Inches	Length Over All, Inches	Price, Each
3/16	30	24	1 1/4	4 1/2	$0.60	7/8	9	9	3 21/32	10	$2.10
1/4	20	20	1 5/8	5	.60	15/16	9	9	3 21/32	10 1/2	2.40
5/16	18	18	1 25/32	5 1/2	.70	1	8	8	4 1/16	11	3.15
3/8	16	16	2 1/16	6	.80	1 1/16	8	8	4 1/16	11	3.40
7/16	14	14	2 11/32	6 1/2	.90	1 1/8	7	7	4 45/64	11 1/2	3.60
1/2	13*	12	2 23/32	7	1.00	1 3/16	7	7	4 45/64	11 1/2	3.90
9/16	12	12	2 23/32	7 1/2	1.15	1 1/4	7	7	4 45/64	12	4.25
5/8	11	11	2 31/32	8	1.30	1 5/16	7	7	4 45/64	12	4.50
11/16	11	11	2 31/32	8 1/2	1.45	1 3/8	6	6	5 13/32	12 1/2	4.80
3/4	10	10	3 1/4	9	1.60	1 7/16	6	6	5 13/32	12 1/2	5.00
13/16	10	10	3 1/4	9 1/2	1.80	1 1/2	6	6	5 13/32	13	5.65

*Can also be furnished with 12 threads per inch.

In ordering, state if Exact or Oversize Taps are wanted, also whether United States Standard or "V" Form thread is wanted.

Machine Screw Taps

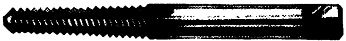
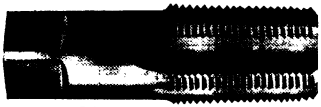


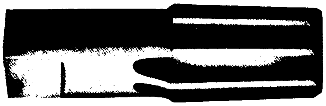
Fig. 808

Screw Gauge Number	Number of Threads Per Inch: Standard	Threads Also Furnished	Price, Each	Price, Per Dozen	Screw Gauge Number	Number of Threads Per Inch: Standard	Threads Also Furnished	Price, Each	Price, Per Dozen
4	36	32, 40, 42, 48	$0.35	$4.00	12	24	20, 32	$0.35	$4.00
6	32	30, 36, 38, 40, 48	.35	4.00	14	20	18, 24	.38	4.40
8	32	30, 36, 40	.35	4.00	16	18	16, 20	.38	4.40
10	24	28, 30, 32, 36	.35	4.00	18	18	16, 20	.38	4.40

Pipe Taps and Reamers



Pipe Tap—Fig. 809



Pipe Reamer—Fig. 810

Diameter ....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Taps—Right or left hand......each	$1.12	1.25	1.50	1.87	2.50	3.12	3.75	4.62	6.25	10.50	15.00
Reamers ....each	1.12	1.25	1.50	1.87	2.50	3.12	3.75	4.62	6.25	10.50	15.00

Patch Bolt Taps

Fig. 811

These Taps are made especially for boiler makers. They are furnished 1-32-inch oversize, and slightly tapered, for the purpose of making the bolt a steam tight fit.

		Number of Threads Per Inch				Number of Threads Per Inch	
Diameter, Inches	Price, Each	United States Standard	"V" Form	Diameter, Inches	Price, Each	United States Standard	"V" Form
1/2	$0.70	12	12	15/16	$1.80	12	12
9/16	.80	12	12	1	2.00	12	12
5/8	.90	12	12	1 1/16	2.15	12	12
11/16	1.05	12	12	1 1/8	2.25	12	12
3/4	1.20	12	12	1 3/16	2.45	12	12
13/16	1.40	12	12	1 1/4	2.60	12	12
7/8	1.60	12	12				

Countersinks

For Drilling Machine—Fig. 812

For Bit Brace—Fig. 813

These tools are made of the very best material, very durable, and can be easily sharpened.

FOR DRILLING MACHINE

For bolts, 54 degrees, 5/8-inch diameter, with 41/64-inch shank........Each $0.50
For screws, 82 degrees, 5/8-inch diameter, with 41/64-inch shank........Each $0.50

FOR BIT BRACE

For bolts, 54 degrees, 5/8-inch diameter..................................Each $0.50
For screws, 82 degrees, 5/8-inch diameter..................................Each $0.50

Bit Brace Taper Reamers

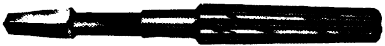


Fig. 814

Straight flute. Quality and finish the very best. Each Reamer at the largest cutting diameter is approximately 1/16-inch larger than size stamped on shank. Each Reamer tapers 1/8-inch and follows from the smallest to the largest.

Diameter, Inches	Length Flute, Inches	Length Over All, Inches	Price, Each	Diameter, Inches	Length Flute, Inches	Length Over All, Inches	Price, Each
1/8	1 5/8	3 3/4	$0.35	5/8	2 5/8	4 3/4	$0.90
3/16	1 3/4	3 7/8	.35	11/16	2 3/4	4 7/8	1.05
1/4	1 7/8	4	.45	3/4	2 7/8	5	1.20
5/16	2	4 1/8	.50	13/16	3	5 1/8	1.40
3/8	2 1/8	4 1/4	.55	7/8	3 1/8	5 1/4	1.60
7/16	2 1/4	4 3/8	.60	15/16	3 1/4	5 3/8	1.80
1/2	2 3/8	4 1/2	.70	1	3 3/8	5 1/2	2.00
9/16	2 1/2	4 5/8	.80				

"Little Giant" Screw Plates

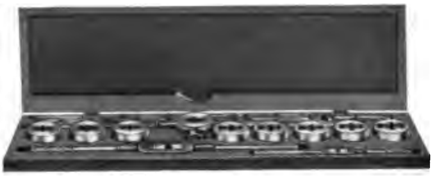
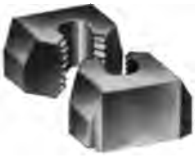


Fig. 815

Number	Length of Stock, Inches	Adjustable Tap Wrench Number	Diameter of Collet, Inches	Cutting	Price, Each
1	14½	5	2	¼-20, 5/16-18, ⅜-16, 7/16-14, ½-13...........	$12.00
2	23	6	2¾	¼-20, ⅜-16, ½-13, ⅝-11, ¾-10.............	13.50
4	26	7	2¾	½-13, ⅝-11, ¾-10, ⅞-9, 1-8...............	17.50
5	23	6	2¾	¼-20, 5/16-18, ⅜-16, 7/16-14, ½-13, ⅝-11, ¾-10.	16.00
6	26	7	2¾	⅜-16, 7/16-14, ½-13, ⅝-11, ¾-10, ⅞-9, 1-8....	22.00
7	26	5 and 7	2¾	¼-20, 5/16-18, ⅜-16, 7/16-14, ½-13, ⅝-11, ¾-10 ⅞-9, 1-8	25.50

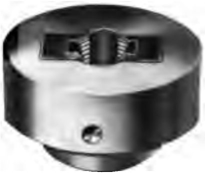
In ordering, state if Exact or Oversize Screw Plates are wanted, also whether United States Standard or "V" Form thread is wanted.

Each assortment is put up in a neat wood case



Dies—Fig. 816

EXTRA PARTS FOR "LITTLE GIANT" SCREW PLATES



Collet and Dies
Fig. 817

Diameter ....inches	¼	5/16	⅜	7/16	½	⅝	¾	⅞	1
Number of threads per inch....................	20	18	16	14	13*	11	10	9	8
Taps ....each	$0.45	.50	.55	.60	.70	.90	1.20	1.60	2.00
Dies only ....per set	1.00	1.00	1.25	1.25	1.50	1.75	2.00	2.75	2.75
Collets only ....each	.50	.50	.50	.50	.50	.50	.50	.50	.50
Collet and dies..........................each	1.50	1.50	1.75	1.75	2.00	2.25	2.50	3.25	3.25

Collets—2 -inches in diameter hold dies, 3/16 to ½-inch.
Collets—2¾-inches in diameter hold dies, ¼ to 1-inch.

It must not be taken for granted that any collet 2¾-inch in diameter will hold any die up to 1-inch in size; a separate collet is needed for each size of die, and the collets furnished are suited to the sizes of dies ordered.

*Furnished with 12 threads when "V" Form thread is ordered.

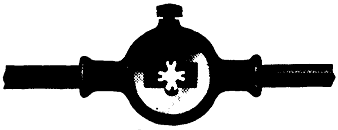


Fig. 818

Stocks

Stock 14½-inches long for Collets 2 -inches in diameter.............................Each	$1.50
Stock 23 -inches long for Collets 2¾-inches in diameter.........................Each	2.00
Stock 26 -inches long for Collets 2¾-inches in diameter.........................Each	2.00

Adjustable Tap Wrenches

FOR MACHINISTS' HAND TAPS

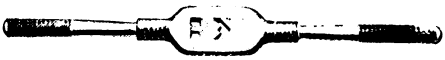


Fig. 819

Number	0	4	5	6	7	7½	8
Length ....inches	7	9	10½	15	20	30	42
For taps.........................inches	1/16 to ¼	1/16 to ⅜	3/16 to ½	¼ to ¾	⅜ to 1	⅜ to 1¼	¾ to 1½
Price ....each	$1.50	1.75	2.00	2.50	3.50	6.50	8.00

Derby Pump Stocks and Dies

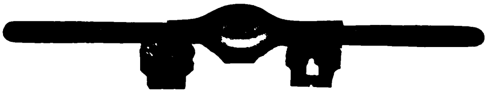


Fig. 820

No. 49—Derby Pump Stock with ⅜-14 thread, 7/16-12 thread, and ½-12 thread dies. Each set of dies mounted in a separate collet. Exact "V" Form thread.

Price....................Each $6.00

Extra Dies................Per set $1.00 Extra Collets...............Each $0.35

Armstrong's Adjustable Stocks and Dies

FOR THREADING PIPE

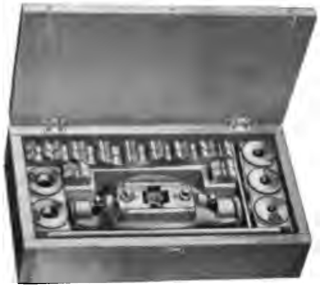


Fig. 821

Number	Sizes of Pipe Each Stock Will Thread, Inches	Sets of Dies	Price With Right Hand Dies, Each	Price With Right and Left Hand Dies, Each
1	⅛, ¼, ⅜, ½	4	$ 9.00	$14.00
2	¼, ⅜, ½, ¾, 1	5	12.00*	20.00
2	⅛, ¼, ⅜, ½, ¾, 1	6	14.00	23.00
2½	½ & ¾, 1 & 1¼	2	12.00*	18.00
2½	¼, ⅜, ½ & ¾, 1 & 1¼	4	18.00	23.00
3	1¼, 1½, 2	3	20.00	32.00
3	1, 1¼, 1½, 2	4	24.00*	40.00
3	¾, 1, 1¼, 1½, 2	5	28.50	48.50
3	½, ¾, 1, 1¼, 1½, 2	6	33.00	57.00
6	2½ & 3	1	40.00	55.00
7	2½ & 3, 3½ & 4	2	60.00*	92.00
7	2½ & 3	1	45.00	60.00
7	3½ & 4	1	45.00	60.00

*Will be furnished unless otherwise specified.
Nos. 6 and 7 Stocks have four arms.

DIES

Number	Description	Per Set of Two Pieces	Per Set of Four Pieces
1	For pipe, right or left hand, single end, ⅛, ¼, ⅜ or ½-inch..........	$1.25	......
2	For pipe, right or left hand, single end, ⅛, ¼, ⅜, ½, ¾ or 1-inch.....	1.50	......
2½	For pipe, right or left hand, double ends, ½ & ¾, 1 & 1¼-inches.....	3.25	......
2½	For pipe, right or left hand, single end, ¼ or ⅜-inch...............	2.50	......
3	For pipe, right or left hand, single end, ½, ¾, 1, 1¼, 1½ or 2-inches..	4.00	......
6	For pipe, right or left hand, double ends, 2½ & 3-inches............	15.00	......
7	For pipe, right or left hand, double ends, 2½ & 3-inches............	.....	$16.00
7	For pipe, right or left hand, double ends, 3½ & 4-inches............	.....	16.00

Oster 3B Matchless Stocks and Dies

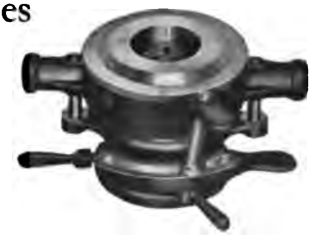


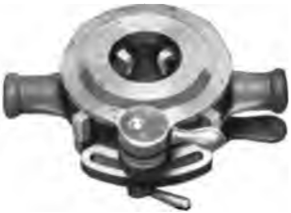
Fig. 822

Equipped with Automatic Receding Dies. The cam control of the dies makes it an easy matter to vary to the size of any fitting. Dies are easily removed and require but one setting for each size of pipe. Duplicate threads are made without resetting the dies. Self-locking and centering guides. No loose bushings. Stock has a patented chip shield, which absolutely prevents chips and oil from clogging the leader screw.

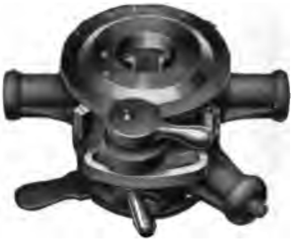
Number	Sizes of Pipe Each Stock Will Thread, Inches	Sets of Dies	Price, Each	Extra Dies Per Set of Four Pieces
3B	**1, 1¼, 1½, 2**	1	$30.00	$2.00

Dies for ½-inch and ¾-inch pipe can be added, by cutting threads without the leader screw.
Left hand dies cannot be supplied for this style stock.

Oster Bull-Dog Stocks and Dies



Nos. 101 to 104½
Fig. 823



Nos. 102R to 105R
Fig. 824

This line of stocks has self-locking and adjustable dies. The dies are controlled by the lever handle on top, as shown in the cut. By moving this handle to the right as far as it will go, the dies are set and held in place while cutting. By moving the handle to the left, the dies are opened and the stock can be removed without turning back over the finished threads.

The tool is equipped with self-locking and centering guides which do away with loose bushings. These guides are operated on a scroll and can be set for all sizes the tool will thread.

The Bull-Dog Ratchet Stocks are made without a leader screw. This makes it possible to furnish the tools with dies for a longer range of sizes.

The Bull-Dog Ratchet Stocks are made with two handles in the body of the tool and with one ratchet handle, so that it can be used at will with two handles as a regular stock or with one handle as a ratchet stock.

BULL-DOG STOCKS AND DIES

Number	Sizes of Pipe Each Stock Will Thread, Inches	Sets of Dies	Price, Each	Extra Dies Per Set of Four Pieces
101	⅛, ¼ & ⅜, ½ & ¾	3	$13.00	$1.50
102	¼ & ⅜, ½ & ¾, 1 & 1¼	3	17.00	1.75
103	1 & 1¼, 1½ & 2	2	22.00	2.00
104	½ & ¾, 1 & 1¼, 1½ & 2	3	25.00	2.00
104½	¼ & ⅜, ½ & ¾, 1 & 1¼, 1½ & 2	4	28.00	2.00
105	1½ & 2, 2½ & 3	2	40.00	3.00
106	2½ & 3, 3½ & 4	2	55.00	3.50

BULL-DOG RATCHET STOCKS AND DIES

102R	¼ & ⅜, ½ & ¾, 1 & 1¼	3	$20.00	$1.75
103R	1 & 1¼, 1½ & 2	2	27.00	2.00
104R	½ & ¾, 1 & 1¼, 1½ & 2	3	30.00	2.00
105R	1½ & 2, 2½ & 3	2	50.00	3.00
106R	2½ & 3, 3½ & 4	2	60.00	3.50

Dies for ⅛-inch pipe can be added to the range of No. 102 at the cost of one extra set of dies.
These stocks are not made with cut-off attachment.

Oster Light Hand Machines

A Geared Machine that one man can easily operate on all sizes.

Can be used as a stock and die, a bench tool or complete with tripod stand.

No leader screw or bushings used. The guides are self-locking and will center the pipe automatically. No pipe vise required.

The dies are started with a lever handle. One movement of the lever brings the die head to position for the next thread. Pipe can be removed without turning back over finished threads.

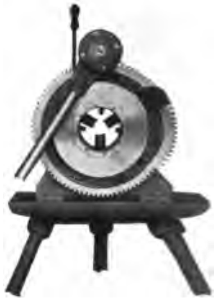
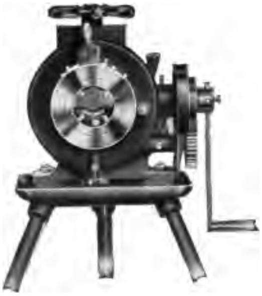


Fig. 825

Number	16	17
Sizes of pipe each machine will thread ... inches	2½ to 4	2½ to 6
Sets of dies	1	4
Price with bench bracket ... each	$110.00	$185.00
Price complete with tripod stand ... each	125.00	200.00
Extra dies, per set of four pieces	4.00	5.00
Add for special dies, 1-inch to 2-inch, per set of four pieces	6.00	7.50
Shipping weight with bench bracket ... pounds	290	420
Shipping weight complete with tripod stand ... pounds	370	530

These machines are not made with cut-off attachment.
Left hand dies cannot be supplied for No. 16 machine.

Oster Hand Machines



Nos. 204 and 206
Front View—Gears Engaged
Fig. 826

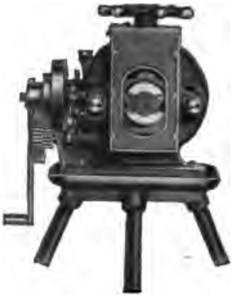
Dies are self-locking, with one movement of the setting handle. Throw it one way and the pipe is released. Throw it the other way and the dies are set to same size.

The dies thread two sizes without change.

Two speeds available for large and small pipe, both on one shaft. The change is made quickly without removing crank or any part of the machine.

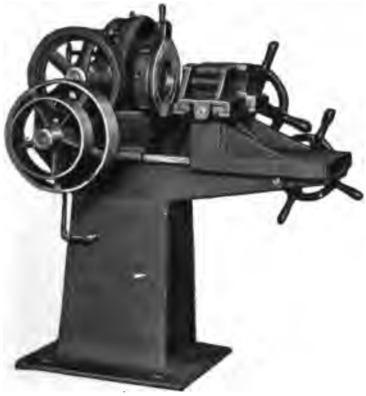
Number	204	206
Sizes of pipe each machine threads and cuts off ....inches	1 to 4	1 to 6
Sets of dies	4	6
Price complete with tripod stand........each	$150.00	$250.00
Deduct for tripod stand if not wanted........each	10.00	25.00
Deduct for oil pan if not wanted........each	4.00	6.00
Extra dies, right or left hand, per set (4 pcs.)....	4.00	5.00
Extra cut-off blades ....each	.75	.75
Shipping weight with oil pan........pounds	620	920
Shipping weight complete with tripod stand.pounds	695	1000

The construction of both machines is identical. The machines differ in size only.



Nos. 204 and 206
Back View
Gears Disengaged
Fig. 827

Oster Pipe and Nipple Machines



No. 304A
Fig. 828

The capacity of these machines for miscellaneous threading, such as nipples, bolts, short bends, as well as regular pipe work, is unlimited. In many cases a machine of this style will do the work of several.

They are equipped with the Oster Patent Lever Controlled Die Head. The dies are all of standard length, and any single die of the set can be replaced.

The vise is in front of the operator. The work is dropped into it from the top; a very convenient arrangement, and making it possible to change quickly. The operation is in plain sight. The vise travels on the bed of the machine right up to the front of the die head, so that short pieces can be handled. Prices on motor driven machines upon application.

Number	Sizes of Pipe Each Machine Will Thread, Inches	Sets of Dies	Price, Each	Extra Pipe Dies, Right or Left Hand, Per Set of Four Pieces	Shipping Weight, Pounds	Description
300A	¼ to 2	4	$200.00	$3.00	1000	Belt Driven
304A	1 to 4	4	300.00	4.00	1530	" "
306A	1¼ to 6	6	425.00	5.00	2240	" "
308A	2½ to 8	6	800.00	10.00	4200	" "

The first three machines listed in above table can be operated by hand power without change of equipment. They can also be furnished for threading bolts.

Detailed information on these machines will be sent upon application.

"Advance" Pipe Machines

DESIGNED ESPECIALLY FOR
JOBBING, CONTRACT SHOP, PLUMBERS AND ALL USERS HAVING CONSTANT EMPLOYMENT FOR A MACHINE OF THIS CHARACTER

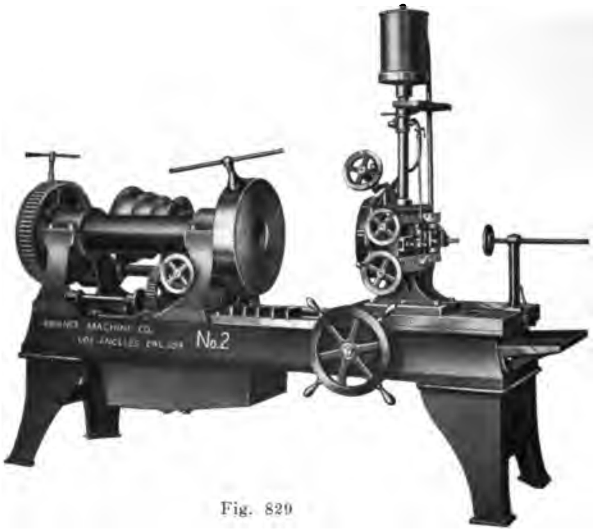


Fig. 829

A most complete, strong and durable machine. Extra long spindle with bearings spread to carry the weight of pipe being threaded.

Equipped with a Three Step Cone Pulley and Back Gears, giving six changes of speed. All gears are machine cut and bearings of genuine babbitt metal. The large chip tray and oil pan is a special feature found in this machine, so arranged to remove fine particles from the oil. It is connected with the oil reservoir on the standard with a plunger pump of approved pattern through a telescopic tube on the back of the machine and out of the way of all overhead works. It has no swinging or universal joints to leak or keep in repair. It is also equipped with an overflow pipe to carry off surplus oil, and tube connections to cutting tool and die head.

An exceptional reamer attachment for taking the burrs from the inside of the pipe after cutting, a feature of great desirability for electric workers, plumbers, etc.

A quick opening die head. Interchangeable dies set with a rake to the cut, giving greater cutting qualities and longer life.

A lock handle that is rigid but easy to operate.

The die head slides to the side of the standard when cutting or reaming pipe, avoiding the danger of injuring the dies. It is free when in use, allowing the pipe to control it, thereby insuring even threads.

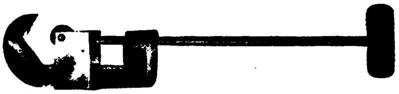
A quick change grip for holding pipe when cutting and a reliable device for cutting. The gripping chuck is of the Three Jaw Universal Pattern, operated by a tee handle wrench.

Each machine is equipped with wrenches, reamer, two cutting-off tools, one complete set of pipe dies and counter shaft.

Number	1	2	3	4	6
Pipe threading range . . . inches	¼ to 2	1 to 4	1½ to 6	2½ to 8	4 to 12
Bolt threading range . . . inches	¼ to 1½	....	....	....	....
Price complete with one die head . . . each	$400.00	600.00	1000.00	1200.00	2000.00
Extra die heads . . . each	25.00	40.00	50.00	75.00	....
Extra pipe or casing dies . . . per set	8.00	10.00	14.00	20.00	25.00
Extra bolt dies . . . per set	8.00	....	....	....	....

Machines also equipped with separate die heads, avoiding the changing of dies. This equipment saves greatly in the time consumed by the operator.

Detailed information on these machines will be sent upon application.



Stanwood Pattern Pipe Cutters

ONE WHEEL

Fig. 830

Number	1	2	3
Cuts pipe ....inches	⅛ to 1	¾ to 2	1¼ to 3
Price ....each	$1.50	2.25	7.00
Extra cutter wheels ....each	.24	.32	.60
Extra cutter blocks and wheels........each	1.25	1.75	2.75
Extra pins ....each	.10	.10	.15
Extra handles ....each	1.00	1.25	2.25

Saunders Pattern Pipe Cutters

ONE WHEEL—TWO ROLLERS

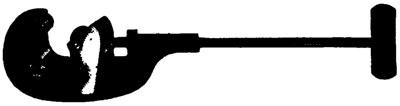


Fig. 831

Number	1	2	3
Cuts pipe ....inches	⅛ to 1	1 to 2	2 to 3
Price ....each	$3.00	4.50	11.00
Extra cutter wheels ....each	.24	.32	.60
Extra cutter blocks and wheels........each	1.25	1.75	2.75
Extra pins ....each	.10	.10	.15
Extra rollers ....each	.24	.32	.50

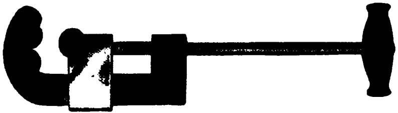


Fig. 832

Barnes Pattern Pipe Cutters

THREE WHEELS

Number	1	2	3	4	5
Cuts pipe ....inches	⅛ to 1	½ to 2	1½ to 3	2½ to 4	4 to 6
Price ....each	$4.50	6.00	10.00	20.00	30.00
Extra cutter wheels ....each	.25	.30	.40	.50	.75
Extra pins ....each	.10	.10	.10	.15	.15
Extra handles ....each	1.00	1.25	2.25	4.50	7.00
Extra hooks ....each	2.00	2.85	4.55	9.50	13.75
Extra slides ....each	.75	1.00	2.00	4.50	7.00

Crumbie Tongs

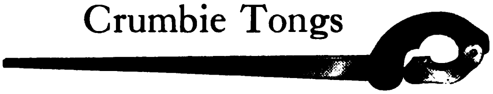
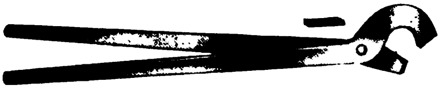


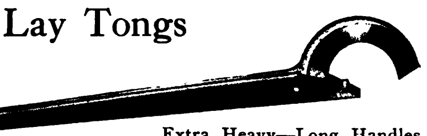
Fig. 833

Size ....inches	2	2½	3	3½
Price ....each	$4.50	5.00	8.25	9.00
Short jaws ....each	1.25	1.25	2.00	2.75
Long jaws ....each	1.50	1.50	2.50	3.25
Handles ....each	1.75	1.75	2.75	3.00
Dies ....each	.41	.41	.55	.55
Set screws ....each	.06	.06	.06	.06

Lay Tongs



Regular
Fig. 834

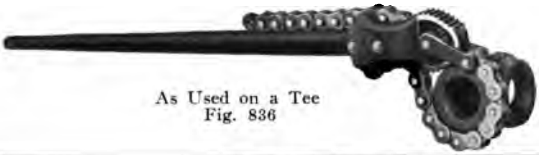


Extra Heavy—Long Handles
Fig. 835

Size ....inches	2	2½	3	3½	4	4½
Regular ....each	$6.50	7.50	9.00	10.25	12.00	13.00
Extra heavy—long handles ...each	9.25	10.25	12.75	13.25	14.25	16.50
Extra bits ....each	.17	.17	.20	.20	.20	.20

"Agrippa"
Patent Drop-Forged Chain Pipe-Fittings Wrench

WITH FLAT LINK CHAIN ONLY

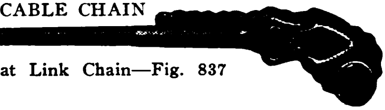


As Used on a Tee
Fig. 836

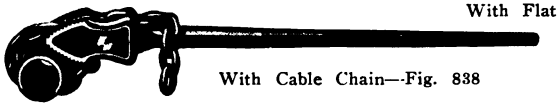
Number	22	23	23½	24	25
For pipe fittings ... inches	¼ to 2½	¾ to 4	1 to 6	1½ to 8	2 to 12
Extreme length ... inches	27	37	44½	50½	64½
Weight ... pounds	9¾	17	24	32	56
Length chain ... inches	19½	26	34	45	61
Breaking strain ... pounds	9800	12500	14300	15700	21800
Wrench complete ... each	$5.00	7.00	9.00	11.00	18.00
Extra chain ... each	1.75	2.75	3.75	4.50	6.75
Extra jaws ... each	2.75	4.00	4.75	5.50	7.50

"Vulcan" Patent Drop-Forged Chain Pipe Wrenches

WITH EITHER FLAT LINK OR CABLE CHAIN



With Flat Link Chain—Fig. 837



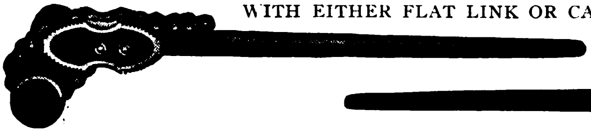
With Cable Chain—Fig. 838

Number	12	13	13½	14	15	16*
For size pipe ... inches	¼ to 2½	¾ to 4	1 to 6	1½ to 8	2 to 12	4 to 18
Extreme length ... inches	27	37	44½	50½	64½	87
Weight ... pounds	10	16	24	31	50	137
Length flat link chain ... inches	17½	22½	31	39	54½	74½
Breaking strain ... pounds	9800	12500	14300	15700	21800	40000
Length cable chain ... inches	18	27	33½	42	57	76
Size iron ... inches	11/32	7/16	15/32	33/64	37/64	13/16
Breaking strain ... pounds	6000	10500	12500	15000	19000	40000
Wrench complete with flat link chain ... each	$5.00	7.00	9.00	11.00	18.00	40.00
Wrench complete with cable chain ... each	5.00	7.00	9.00	11.00	18.00	40.00
Extra chain (either flat or cable) ... each	1.50	2.50	3.25	4.00	6.00	13.00
Extra jaws ... per pair	2.75	4.00	4.75	5.50	7.50	16.00
Extra screws and pins ... per set	.25	.30	.35	.40	.50	1.30

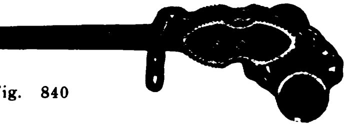
*Has eye on end of handle.

"Vulcan Bijaw"
Patent Drop-Forged Chain Pipe Wrenches

WITH DOUBLE-ENDED REVERSIBLE JAWS
WITH EITHER FLAT LINK OR CABLE CHAIN



With Flat Link Chain—Fig. 839



With Cable Chain—Fig. 840

Number	32	33	33½	34	35
For size pipe ... inches	¼ to 2½	¾ to 4	1 to 6	1½ to 8	2 to 12
Extreme length ... inches	27	37	44½	50½	64½
Weight ... pounds	10	16	24	31	50
Length flat link chain ... inches	17½	22½	31	39	54½
Breaking strain ... pounds	9800	12500	14300	15700	21800
Length cable chain ... inches	18	27	33½	42	57
Size iron ... inches	11/32	7/16	15/32	33/64	37/64
Breaking strain ... pounds	6000	10500	12500	15000	19000
Wrench complete with flat link chain ... each	$5.00	7.00	9.00	11.00	18.00
Wrench complete with cable chain ... each	5.00	7.00	9.00	11.00	18.00
Extra chain (either flat or cable) ... each	1.50	2.50	3.25	4.00	6.00
Extra jaws ... per pair	2.75	4.00	4.75	5.50	7.50
Extra studs and nuts ... per set	.35	.45	.55	.70	.90

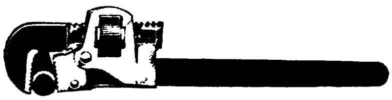


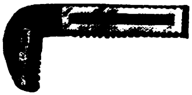
Fig. 841

Trimo Pipe Wrenches

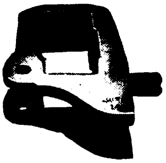
Drop forged from selected bar steel. Polished and hardened jaw, frame and inserted jaw. Knurled nut. Solid iron handle. Will not crush the pipe or slip.

Length open...........inches	6	8	10	14	18	24	36	48
For size pipe..........inches	⅛ to ½	⅛ to ¾	⅛ to 1	¼ to 1½	¼ to 2	¼ to 2½	½ to 3½	1 to 5
Price ....each	$2.00	2.00	2.25	3.00	4.00	6.00	12.00	18.00

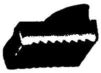
PARTS FOR TRIMO PIPE WRENCHES



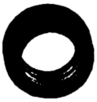
Movable Jaw
Fig. 842



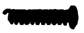
Frame
Fig. 843



Inserted Jaw
Fig. 844



Nut
Fig. 845

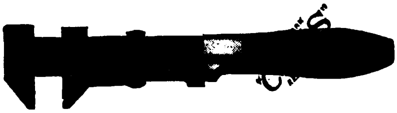


Spring and Pin
Fig. 846

Size ....inches	6	8	10	14	18	24	36	48
Movable jaw..............................each	$0.75	.75	.80	1.00	1.33	2.10	4.75	7.25
Frame .... "	.35	.35	.40	.50	.55	.80	1.30	1.50
Inserted jaw .... "	.35	.35	.45	.55	.65	.75	1.05	1.35
Nut .... "	.11	.11	.14	.17	.22	.35	.55	.95
Spring .... "	.03	.03	.03	.03	.04	.04	.04	.04
Frame pin .... "	.03	.03	.04	.04	.04	.04	.05	.05
Jaw pin .... "	.03	.03	.04	.04	.04	.04	.05	.05

Coes' "Genuine" Screw Wrenches

KNIFE HANDLE



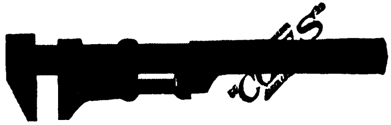
Knife Handle
Fig. 847

Forged from tool steel. One piece bar and head. Case hardened jaws. Shank extends through to end of handle. Polished malleable iron ferrules. Machine cut steel adjusting screw with knurled head. Hardwood grips. Secured by rivetting through frame.

STEEL HANDLE

Forged from tool steel. The 6, 8 and 10-inch sizes are of the same specifications as the knife handle wrenches with the exception of the steel handle. The 12, 15, 18 and 21-inch sizes are made with ball bearing screw and extended screw support.

Adapted for rough usage, and in exposed places, where heat or dampness would injure a wood handle.



Steel Handle
Fig. 848

Size ....inches	6	8	10	12	15	18	21
Black knife handle ....per dozen	$9.00	10.00	12.00	14.00	24.00	30.00	36.00
Steel handle ....per dozen	9.00	10.00	12.00	14.00	24.00	30.00	36.00

Coes' "Genuine" Key Model Wrenches

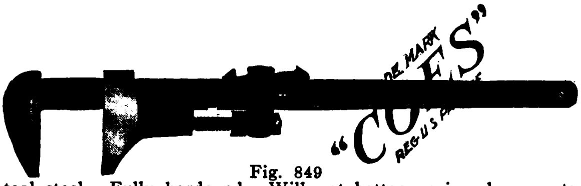


Fig. 849

Forged from tool steel. Fully hardened. Will not batter or jam large nuts. Holds anything within its opening capacity whether square or hexagon. An ideal engine room tool.

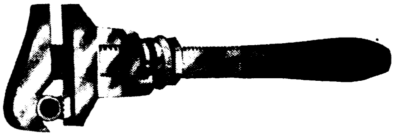
Length Over All	Capacity	Weight Each	Price Each
28-Inches	6⅝-Inches	19 Pounds	$9.75

Can be furnished on special orders in 36, 48 and 72-inch sizes.

Combination Wrenches

BEMIS AND CALL

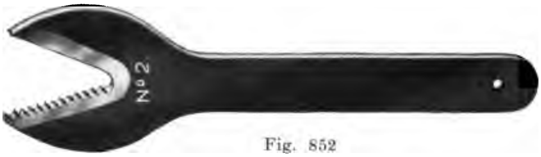
Long Nut
Fig. 850



Short Nut
Fig. 851

A strong and serviceable combination of a nut and pipe wrench, equally efficient in either capacity. Forged from tool steel. One piece bar and head. Polished ferrule, cap and hardwood handle.

Size ....inches	8	10	12	15	18
Holds pipe ....inches	¼ to ¾	¼ to 1	½ to 1¾	½ to 2¼	½ to 3
Long nut....per dozen	$23.00	25.25	28.50	40.50	72.00
Short nut....per dozen	21.00	23.00	26.00	37.00	66.00



Alligator Wrenches

Fig. 852

Drop forged from special crucible steel, oil tempered, milled teeth, polished jaws, natural finish body.

Number	2	3	4	5
Holds pipe ....inches	⅜ to ¾	½ to 1¼	1¼ to 2	2 to 3
Holds round iron ....inches	½ to 1	¾ to 1⅜	1½ to 2½	2¼ to 3½
Length ....inches	9	15	22	28
Price ....per dozen	$12.00	24.00	36.00	60.00

Twin Alligator Wrenches

Fig. 853

Drop forged from special crucible steel, oil tempered, milled teeth, polished jaws, natural finish body.

Number	Holds Pipe, Inches	Holds Round Iron, Inches	Length, Inches	Price, Per Dozen
14	⅛ to ¾	¼ to 1	10	$18.00

Always Ready Wrenches

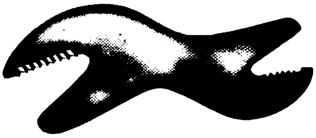


Fig. 854

Drop forged from tool steel, nickel plated, oil tempered, milled teeth.

Number	Holds Nuts or Pipe, Inches	Length, Inches	Price, Per Dozen
1	¼ to ¾	5	$5.00
2	¼ to 1¼	7	6.75

Crescent Adjustable Engineers' Wrenches

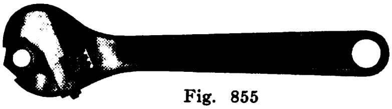
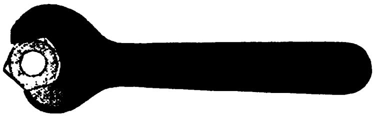


Fig. 855

Drop forged from the best carbon steel. The entire wrench is carbonized, hardened and oil tempered. Polished all over except web in handle, which is black oil finish.

Size ....inches	6	8	10	12	15
Capacity ....inches	¾	15/16	1⅛	1 5/16	1 11/16
Price ....each	$0.65	.80	1.00	1.25	1.60
Price ....per dozen	$7.80	9.60	12.00	15.00	19.20

Engineers' Wrenches



DROP FORGED—15° ANGLE
FOR UNITED STATES STANDARD NUTS

Fig. 856

SINGLE HEAD

Number	Size Bolt, U. S. Standard Nut, Inches	Opening Milled, Inches	Extreme Length, Inches	Thickness of Head, Inches	Unfinished, Each	Semi-Finished, Each	Finished, Each
1	1/4	1/2	4	1/4	$0.10	$0.15	$0.20
2	5/16	19/32	4 3/4	9/32	.12	.18	.24
3	3/8	11/16	5 5/8	5/16	.14	.21	.28
4	7/16	25/32	6 1/2	11/32	.17	.25	.34
5	1/2	7/8	7 1/2	13/32	.20	.30	.40
6	9/16	31/32	8 3/8	7/16	.26	.39	.52
7	5/8	1 1/16	9 1/4	1/2	.32	.48	.64
8	3/4	1 1/4	11 1/8	9/16	.42	.63	.84
9	7/8	1 7/16	13	21/32	.58	.87	1.16
10	1	1 5/8	14 3/4	3/4	.75	1.13	1.50
11	1 1/8	1 13/16	16 1/2	27/32	1.00	1.50	2.00
12	1 1/4	2	18 1/2	29/32	1.25	1.88	2.50
13	1 3/8	2 3/16	20	1	1.62	2.43	3.24
14	1 1/2	2 3/8	22	1 1/16	2.00	3.00	4.00

Single Head Wrenches of the above style, but with handle tapered, will be furnished on orders for the larger sizes, beginning with No. 11.

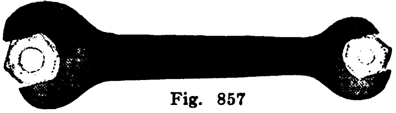


Fig. 857

DOUBLE HEAD

Number	Size Bolt, U. S. Standard Nut, Inches	Opening Milled, Inches	Extreme Length, Inches	Thickness of Head, Inches	Unfinished, Each	Semi-Finished, Each	Finished, Each
22	1/8 & 1/4	5/16 & 1/2	4	3/16 & 1/4	$0.13	$0.20	$0.26
25	1/4 & 5/16	1/2 & 19/32	4 7/8	9/32 & 9/32	.18	.27	.36
26	1/4 & 3/8	1/2 & 11/16	5 7/8	9/32 & 5/16	.20	.30	.40
27	5/16 & 3/8	19/32 & 11/16	5 7/8	5/16 & 5/16	.22	.33	.44
28	5/16 & 7/16	19/32 & 25/32	6 7/8	5/16 & 11/32	.24	.36	.48
29	3/8 & 7/16	11/16 & 25/32	6 7/8	11/32 & 11/32	.26	.39	.52
30	3/8 & 1/2	11/16 & 7/8	7 3/4	11/32 & 13/32	.28	.42	.56
32	7/16 & 9/16	25/32 & 31/32	8 3/4	13/32 & 7/16	.32	.48	.64
34	1/2 & 5/8	7/8 & 1 1/16	9 3/4	7/16 & 1/2	.40	.60	.80
35	9/16 & 5/8	31/32 & 1 1/16	9 3/4	1/2 & 1/2	.44	.66	.88
36	9/16 & 3/4	31/32 & 1 1/4	11 1/2	1/2 & 9/16	.51	.77	1.02
37	5/8 & 3/4	1 1/16 & 1 1/4	11 1/2	9/16 & 9/16	.58	.87	1.16
38	5/8 & 7/8	1 1/16 & 1 7/16	13 1/2	9/16 & 21/32	.65	.98	1.30
39	3/4 & 7/8	1 1/4 & 1 7/16	13 1/2	21/32 & 21/32	.76	1.14	1.52
40	3/4 & 1	1 1/4 & 1 5/8	15 1/2	21/32 & 3/4	.88	1.32	1.76
41	7/8 & 1	1 7/16 & 1 5/8	15 1/2	3/4 & 3/4	1.00	1.50	2.00
43	1 & 1 1/8	1 5/8 & 1 13/16	17	27/32 & 27/32	1.36	2.04	2.72
44	1 & 1 1/4	1 5/8 & 2	19	27/32 & 29/32	1.55	2.33	3.10

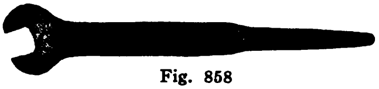


Fig. 858

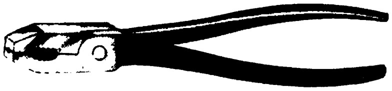
Construction Wrenches

DROP FORGED—15° ANGLE
FOR UNITED STATES STANDARD NUTS

Number	Size Bolt, U. S. Standard Nut, Inches	Opening Milled, Inches	Extreme Length, Inches	Thickness of Head, Inches	Unfinished, Each	Semi-Finished, Each	Finished, Each
223	3/8	11/16	9 1/2	7/16	$0.20	$0.30	$0.40
224	7/16	25/32	9 1/2	7/16	.20	.30	.40
225	1/2	7/8	11	1/2	.35	.53	.70
226	9/16	31/32	11	1/2	.35	.53	.70
227	5/8	1 1/16	13	9/16	.50	.75	1.00
228	3/4	1 1/4	15	5/8	.65	.97	1.30
229	7/8	1 7/16	17	11/16	.85	1.28	1.70
230	1	1 5/8	19	3/4	1.10	1.65	2.20

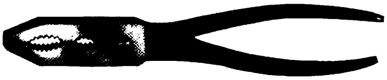
Burner and Gas Pliers

BURNER



Sizes—5 and 6-Inch
Fig. 859

GAS



Sizes—7 to 14-Inch
Fig. 860

Drop forged from high grade tool steel, polished jaws, blued handles, oil tempered and milled teeth.

Length ....inches	5	6	7	8	10	12	14
Holds pipe.............inches	½ and Smaller	¾ and Smaller	1 to ½	1¼ to ¾	1½ to ¾	1¾ to ¾	2 to ¾
Burner pliers......per dozen	$5.00	6.00	....	....	....	....	....
Gas pliers ....per dozen	....	....	$7.00	7.50	9.50	12.00	15.00

Button's Pattern Pliers

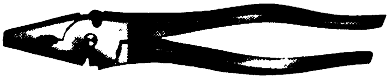


Fig. 861

Drop forged from high grade tool steel, highly polished, blued handles, oil tempered. Three wire cutters.

Length ....inches	4½	6	8	10
Will cut wire number..................................	14	11	8	6
Price....................................per dozen	$10.00	12.00	15.00	20.00

Snips

Solid cast iron. Case hardened, polished blades. Japanned handles.

Number	1	2	3
Length of cut .....inches	2	2½	3
Length over all ....inches	10¼	11¼	12¼
For cutting iron...number	29	28	27
Price...........per dozen	$12.00	15.00	18.00

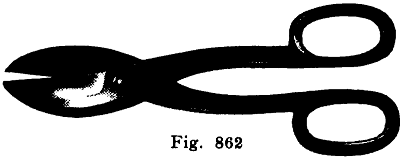


Fig. 862

Soldering Coppers

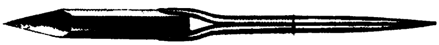


Fig. 863

Sharp for ordinary use. Japanned wrought iron welded shank, without handles.

Weight per pair....pounds	¾	1	1½	2	3	4	5	6	8	10	12
Length of copper....inches	2¾	3	3¾	4	4¾	5	5½	5¾	6½	7	7½
Length over all.....inches	10	10½	12	14	14	15	15	17	17½	18	18
Price...........per pound	$0.68	.66	.63	.62	.60	.60	.60	.60	.60	.60	.60

When one only is wanted, order as half pair.

Soldering Copper Handles

Plain hardwood. Natural finish, with wired shank. Diameter, 1¼-inches. Length, 5¼-inches.

Per dozen..............................$0.75

Fig. 864

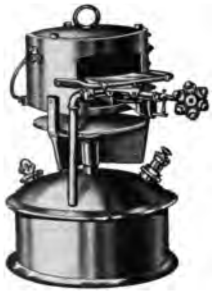


Fig. 865

Fire Pots

CLAYTON AND LAMBERT

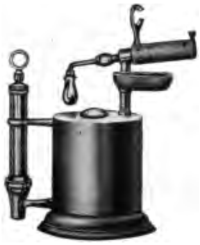
No. 1—Heavy Galvanized Iron Tank. Sheet steel hood. Burner attached to swivel joint, which permits moving the flame up or down. Burner fitted with clean-out plugs and will not become clogged or eaten out by drippings. Will heat soldering coppers and a kettle of lead or solder at the same time. By removing the top section an open fire is exposed, which may be used as a torch or brazing fire. Serviceable in taking soil pipe apart, thawing pipe, wiping joints, removing paint and for conductor pipe, cornice and roof work.

No. 5—An exact duplicate of No. 1, with the exception of being about two-thirds its size.

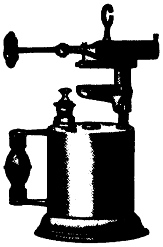
Number	1	5
Capacity ... pints	7	5
Diameter of top ... inches	6¾	6
Diameter of bottom ... inches	9¼	8½
Height ... inches	12½	12
Weight per dozen ... pounds	175	150
Price ... each	$12.00	9.00

Torches

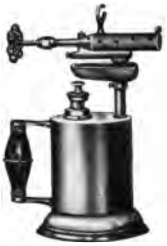
CLAYTON AND LAMBERT



No. 30—Fig. 866



No. 32—Fig. 867



No. 38—Fig. 868

Made of polished seamless brass. Air pump of brass. Cast iron burner. Perfect fire indoors or out. All furnished with hook on burner for holding soldering coppers.

No. 30—Round Pattern. Pump in handle fitted with an automatic check valve, and a safety air tube which extends from the bottom of the handle to the top of the tank above the gasoline, preventing gasoline from getting into the pump.

No. 32—Round Pattern with Pump in Tank. Plain brass handle.

No. 38—Round Pattern with Pump in Tank. Plain brass handle. Equipped with improved shielded burner tube.

Number	30	32	38
Capacity ...	1-Quart	1-Quart	1-Pint
Diameter ... inches	5¾	5¾	4¾
Height over all ... inches	11	11	8⅞
Weight per dozen ... pounds	65	62	50
Price ... each	$7.00	8.00	7.00

Cant Hooks

Wrought steel clasp. Extension toe ring. Duckbill hook. Select rock maple handle.

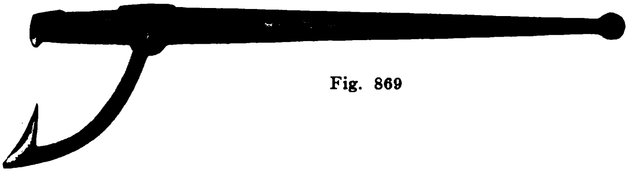


Fig. 869

Socket, Inches	Length Handle, Feet	Kind of Handle	Weight Per Dozen, Pounds	Price, Per Dozen
2½	5	Select Rock Maple	100	$21.90

Peavies

Solid malleable iron socket. Duckbill hook. Heavy steel bolt. Select rock maple handle.

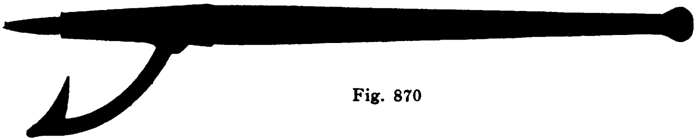


Fig. 870

Socket, Inches	Length Handle, Feet	Kind of Handle	Weight Per Dozen, Pounds	Price, Per Dozen
2½	5	Select Rock Maple	100	$27.10

HANDLES FOR CANT HOOKS AND PEAVIES

Select rock maple, 2½-inches x 5-feet. Weight per dozen, 50 pounds. Price........Per dozen $9.00

Mortar Hoes

Polished steel, two hole blade. Solid shank. Gold bronzed. Extra select handles.

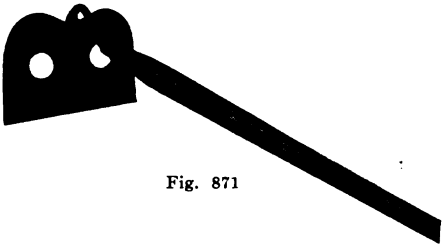


Fig. 871

Width of Blade, Inches	Length Handle, Feet	Weight Per Dozen, Pounds	Price, Per Dozen
9 10	5½ 6	43 47	$26.00 27.90

Warehouse Brooms

Designed for heavy mill, shop and warehouse sweeping. Made of the best Illinois broom corn with a Japanese fibre center. This fibre is smaller than the rattan and flat. It has the same life and elasticity and keeps the broom in shape. The fibre will enter cracks and crevices too small for the rattan and will not fling or scatter sweepings.

Securely nailed, clinched and compressed in a solid metal case, supplemented by an additional metal band and two rows of sewing.

No. 10—Weight per dozen, 40 pounds. Price..Per dozen $10.00

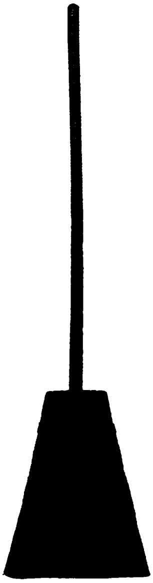


Fig. 872

Hammers
Adzes and Axes
Hatchets, Chisels and Gouges
Planes and Saws
Calipers and Dividers
Hand and Breast Drills

Braces, Bits, Augers
Plumbs and Levels
Drawing Knives
Oil Stones
Squares and Rules
Tapes

Files and Rasps
Emery Wheels and Grinders
Grindstones
Screw Drivers
Speed Indicators
Pitch Gauges

Gong Bells
Rivets and Burrs, Etc.
Padlocks
Chain
Wrought Hardware
Miscellaneous Hardware

Pages 331 to 355 Inclusive

Nail Hammers

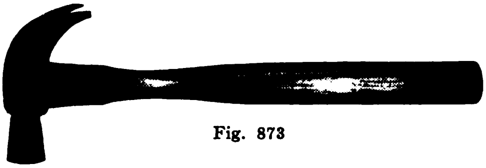


Fig. 873

ADZE EYE—PLAIN FACE

Drop forged from crucible bar steel. Hardened face. Highly polished. Tempered regular curved claws. White hickory handles.

Number	0	1	1½	2	3
Weight without handle ounces	28	20	16	13	7
Length over all inches	14	14	13	13	12
Price per dozen	$12.50	9.00	8.50	8.00	7.50

ADZE EYE—BELL FACE

BLACK NECK

Drop forged from crucible bar steel. Hardened face. Highly polished. Tempered regular curved claws. White hickory handles.

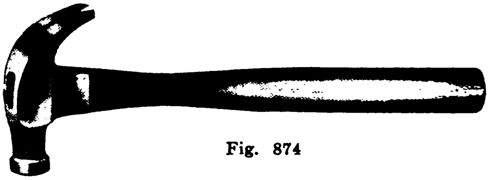


Fig. 874

Number	11	11½	12	13
Weight without handle ounces	20	16	13	7
Length over all inches	14	13	13	12
Price per dozen	$9.00	8.50	8.00	7.50

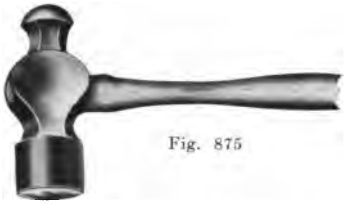


Fig. 875

Machinists' Ball Pein Hammers

Drop forged from crucible bar steel. Hardened face and pein. High polished finish and temper blued. White hickory handles.

Number	00	0	1	2	3	4	5	6	7	8
Weight without handle ounces	12	16	20	24	28	32	36	40	44	48
Length over all inches	13½	14½	15	16	16½	17	17	17¼	17¼	17½
Price per dozen	$12.00	12.50	13.50	14.50	15.50	16.50	17.50	19.00	20.50	22.00

Blacksmiths' Hand Hammers

Drop forged from crucible bar steel. Hardened face and pein. Plain eye. Cross pein. Highly polished. White hickory handles.

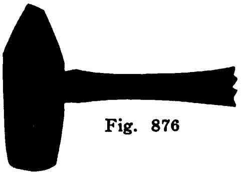


Fig. 876

Number	0	1	2	3	4	5
Weight without handle ounces	26	32	42	48	56	72
Length over all inches	15	15½	16	16½	17	18
Price per dozen	$13.00	14.00	15.00	16.00	17.00	19.00

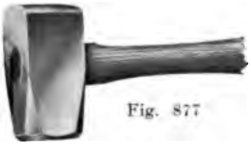


Fig. 877

Prospecting Hammers

Drop forged from crucible bar steel. Hardened round-octagon face. Straight rounding back. Highly polished. White hickory handles.

Number	Weight Without Handle, Ounces	Length Over All, Inches	Price, Per Dozen
1	22	15	$14.00
2	28	15	15.00

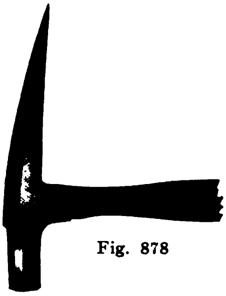
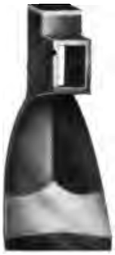


Fig. 878

Prospecting Picks

Drop forged from crucible bar steel. Adze eye. Hardened point and octagon poll. Highly polished. White hickory handles.

Number	1	2
Weight without handle ....ounces	16	24
Length of head ....inches	7½	8
Length over all ....inches	13	13
Price ....per dozen	$15.00	16.00



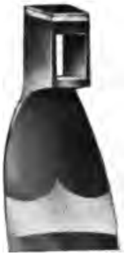
Half Head
Fig. 879

Adzes

HOUSE CARPENTERS'

Forged from special crucible steel. Natural black finish. Polished bit. Carefully tempered and ground. Hardened head. Solid punched eye.

	Half Head		Full Head	
Number	H-4	H-4½	F-4	F-4½
Width of cut...............inches	4	4½	4	4½
Length ....inches	9¼	9¼	11¼	11¼
Price ....per dozen	$24.00	24.00	$32.00	32.00



Full Head
Fig. 880

Axes

"RED RIDGE"—MICHIGAN PATTERN

SINGLE BIT AND HANDLED

Soft steel body. Hardened poll. Solid punched eye. Hand hammered crucible steel bit carefully tempered and polished. Body painted red. White oval hickory handles.

Assorted weights, 3 to 4 lbs...........	Per dozen $14.00
Assorted weights, 3½ to 4½ lbs...........	Per dozen 14.25
Assorted weights, 4 to 5 lbs...........	Per dozen 14.50

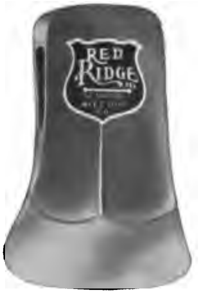


Fig. 881

Rig Builders' Hatchets

"OIL KING"

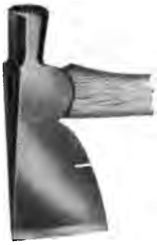


Fig. 882

Forged from crucible cast steel. Oil tempered. Black finish. Scored head. White hickory handles.

Size	Width of Cut, Inches	Length of Handle, Inches	Weight Per Dozen, Pounds	Price, Per Dozen
3	3¼	18	33	$12.00

GERMANTOWN

Solid tool steel. Octagon neck. Round poll. Fire bronze finish. Scored head. White hickory handles.

Number	Size	Width of Cut, Inches	Length of Handle, Inches	Price, Per Dozen
1317½	1	3¼	18	$15.00
1318	2	3½	18	15.50
1318½	3	3¾	18	16.00

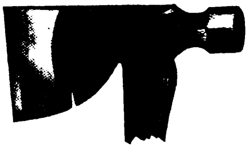
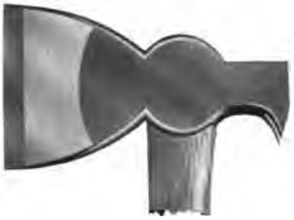


Fig. 883

Hatchets

HUNT'S

Hand forged and carefully tempered. Box eye. Polished bits. Gold bronze finish. Selected second-growth white hickory handles.



Claw—Fig. 884

Shingling—Fig. 885

	Claw			Shingling		
Size	1	2	3	1	2	3
Width of cut ... inches	3½	3⅞	4⅜	3½	3⅞	4⅜
Length over all ... inches	13	14	14½	13	14	14½
Price ... per dozen	$9.00	9.50	10.00	$8.00	8.50	9.00

BROAD OR BENCH

WESTERN PATTERN

SINGLE OR DOUBLE BEVEL

Size	2	3	4	5
Width of cut ... inches	4½	5	5½	6
Length over all ... inches	14½	15	15½	17
Price ... per dozen	$11.50	13.00	14.50	16.50

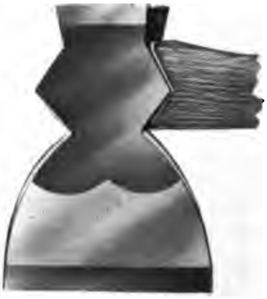


Fig. 886

Chisels

SOCKET FIRMER

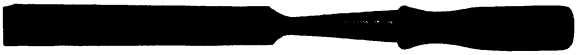


Fig. 887

Forged tool steel. Plain back. Blade 6½-inches long. Oil tempered. Full polish. Leather capped hickory handle.

Size ....inches	¼	⅜	½	⅝	¾	⅞	1	1¼	1½	1¾	2
Price ....per dozen	$14.00	14.00	14.00	15.50	16.00	18.00	18.50	20.50	22.00	24.00	25.00

SOCKET FRAMING

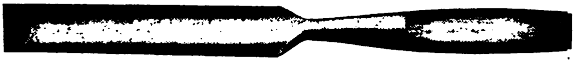


Fig. 888

Forged tool steel. Oval back. Blade 8-inches long. Oil tempered. Full polish. Hickory handle with iron ring.

Size ....inches	¼	⅜	½	⅝	¾	⅞	1	1¼	1½	1¾	2
Price ....per dozen	$9.00	9.00	9.00	9.50	10.00	10.50	11.00	12.00	13.00	14.50	16.00

SOCKET CORNER

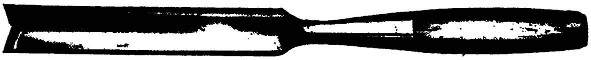


Fig. 889

Forged tool steel. Inside bevel. Blade 8-inches long. Oil tempered. Full polish. Hickory handle with iron ring.

Size ....inches	½	⅝	¾	⅞	1	1¼
Price ....per dozen	$16.00	16.00	16.00	17.00	18.25	20.25

SOCKET FIRMER GOUGES

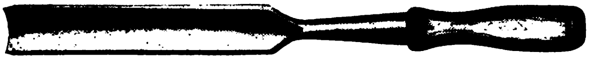


Fig. 890

Forged tool steel. Outside bevel. Blade 6½-inches long. Oil tempered. Full polish. Leather capped hickory handle.

Size ....inches	¼	⅜	½	⅝	¾	⅞	1	1¼	1½	1¾	2
Price ....per dozen	$10.50	10.50	11.00	11.50	12.25	13.25	14.00	15.50	17.25	18.75	21.25

Carpenters' Slicks

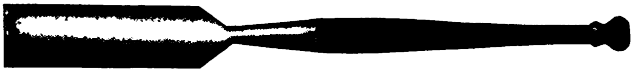


Fig. 891

Extra cast steel. Heavy socket. Blade 10-inches long. Oil tempered. Full polish. Polished hard maple handle.

Size ....inches	2½	3	3½	4
Price ....per dozen	$21.00	23.50	27.50	32.00

Handles

SOCKET FIRMER CHISEL

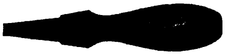


Fig. 892

Hickory—Assorted Sizes.

Per dozen........$0.50

SOCKET FRAMING CHISEL

Fig. 893

Hickory—Iron Ringed.

Per dozen........$0.70

FILE

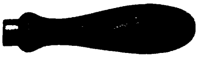


Fig. 894

Soft Wood—Brass Ferrule.

Per dozen........$0.50

PRATT'S ADJUSTABLE AUGER

Selected Ash—Malleable Iron Center Frame
Holds and Centers All Sizes of Augers
No. 1—14-inches long..Per dozen $12.00
No. 2—17-inches long..Per dozen $12.00

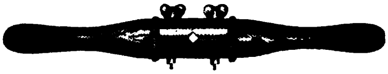


Fig. 895

ADZE EYE NAIL HAMMER

Fig. 896

Length, inches	13	14
Per dozen	$1.75	1.75

MACHINISTS' HAMMER

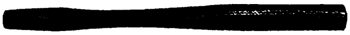


Fig. 897

Length, inches	16	18
Per dozen	$1.75	2.00

BROAD HATCHET

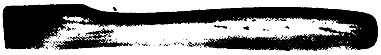


Fig. 898

Length, inches	16	18
Per dozen	$2.00	2.50

RIG BUILDERS' HATCHET

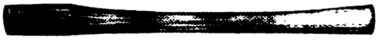


Fig. 899

Length, inches	18
Per dozen	$2.75

ADZE

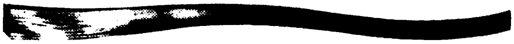


Fig. 900

34-inch Turned. All White Second Growth Hickory............Per dozen $7.00

AXE

Fig. 901

36-inch Turned. All White Second Growth Hickory............Per dozen $6.50

SURFACE OR RAILROAD PICK AND MATTOCK

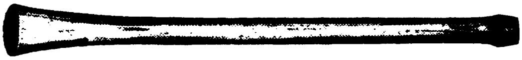


Fig. 902

36-inch Turned. All White Second Growth Hickory............Per dozen $8.00

SLEDGE

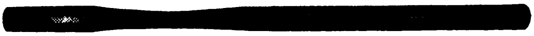


Fig. 903

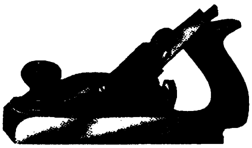
Oval Turned—White Hickory

28-inch	Per dozen $3.50	34-inch	Per dozen $5.00
30-inch	Per dozen 4.00	36-inch	Per dozen 5.50
32-inch	Per dozen 4.50		

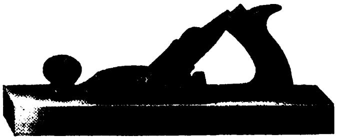
Bailey Adjustable Planes

WOOD BOTTOM

Varnished beechwood bottom, knob and handle. Japanned cast iron frame. Polished cap. Tempered and polished tool steel cutters. Screw and lever adjustments.



HANDLED SMOOTH
Fig. 904

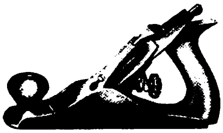


JACK, FORE AND JOINTER
Fig. 905

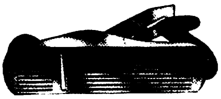
Classification	Handled Smooth		Jack			Fore		Jointer		
Number	35	36	26	27	27½	28	29	30	31	32
Length ... inches	9	10	15	15	15	18	20	22	24	26
Size of cutter ... inches	2	2⅜	2	2⅛	2¼	2⅜	2⅜	2⅜	2⅜	2⅝
Price ... each	$1.90	2.05	1.65	1.90	1.95	2.05	2.10	2.20	2.25	2.40

IRON

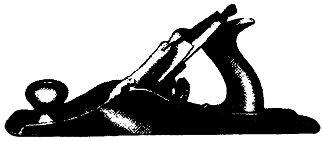
Japanned cast iron frame. Varnished rosewood knob and handle. Highest grade steel cutters, oil tempered and polished. Screw and lever adjustments.



SMOOTH
Fig. 906



SHOWING CORRUGATED BOTTOM
Fig. 907



JACK, FORE AND JOINTER
Fig. 908

SMOOTH BOTTOM

Classification	Smooth				Jack		Fore	Jointer	
Number	2	3	4	4½	5	5½	6	7	8
Length ... inches	7	8	9	10	14	15	18	22	24
Size of cutter ... inches	1⅝	1¾	2	2⅜	2	2¼	2⅜	2⅜	2⅝
Price ... each	$2.00	2.10	2.20	2.50	2.50	3.00	3.25	3.75	4.50

CORRUGATED BOTTOM

Classification	Smooth				Jack		Fore	Jointer	
Number	2C	3C	4C	4½C	5C	5½C	6C	7C	8C
Length ... inches	7	8	9	10	14	15	18	22	24
Size of cutter ... inches	1⅝	1¾	2	2⅜	2	2¼	2⅜	2⅜	2⅝
Price ... each	$2.00	2.10	2.20	2.50	2.50	3.00	3.25	3.75	4.50

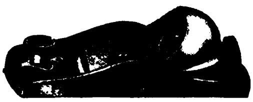


Fig. 909

Block Planes

BAILEY

Japanned cast iron frame, with the "Handy" feature, giving a secure grip. Adjustable throat opening. High grade steel cutters, oil tempered and polished.

No. 60—Low Angle Block. Nickel trimmings, with screw adjustment.
Length, 6-inches. Size of cutter, 1⅜-inches................Each $1.25
No. 65—Low Angle Block. Nickel trimmings, with screw adjustment.
Length, 7-inches. Size of cutter, 1⅝-inches.................Each $1.35

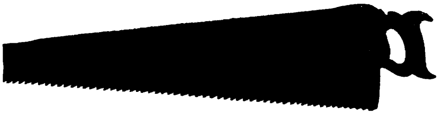


Fig. 910

Hand and Rip Saws

No. 10—Special crucible steel blade, grained and etched, straight back, beech handle, four brass screws.

26-inch Hand Saws, 5 to 12 points, weight per dozen, 24 pounds	per dozen	$20.00
28-inch Hand Saws, 5 to 10 points, weight per dozen, 30 pounds	per dozen	23.50
26-inch Rip Saws, 5 to 6 points, weight per dozen, 24 pounds	per dozen	20.00
28-inch Rip Saws. 5 to 6 points, weight per dozen, 30 pounds	per dozen	23.50

Compass Saws

Crucible steel, polished apple handle, two brass screws.

Length ... inches	10	12	14	16
Price ... per dozen	$4.25	4.50	4.75	5.00

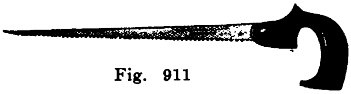


Fig. 911

One-Man Cross-Cut Saws

Tuttle Tooth—Fig. 912

High grade crucible steel. Crescent ground. Polished and etched. Beech handle, plain sides with varnished edges. Supplementary handle of varnished beech, and malleable iron ferrule.

Length ... feet	4	4½	5	5½	6
No. 111—Tuttle tooth, straight back ... each	$2.32	2.61	2.90	3.19	3.48
No. 237—Lance tooth, sway back ... each	2.88	3.24	3.60	3.96	4.32

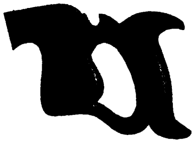


Fig. 913

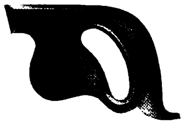
Hand Saw Handles

Selected beech, varnished, slit but not bored.

For saws ... inches	24–26	28
Price ... per dozen	$2.50	2.75

Price does not include screws.

One-Man Cross-Cut Saw Handles



Regular—Fig. 914

Selected beech, plain sides with varnished edges. With three holes.

Weight per dozen.....7½ pounds

Per dozen..................$4.50

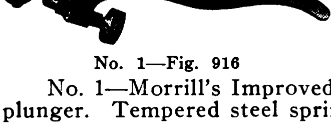
Supplementary—Fig. 915

Supplementary or point handle, 5¼-inches long, malleable iron ferrule. Washer, rod and nut fastened inside.

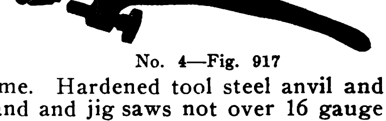
Weight per dozen......4 pounds

Per dozen..................$2.25

Genuine Morrill's Saw Sets



No. 1—Fig. 916



No. 4—Fig. 917

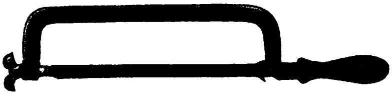
No. 1—Morrill's Improved. Semi-steel frame. Hardened tool steel anvil and plunger. Tempered steel spring. For hand, band and jig saws not over 16 gauge thick. Capable of very fine adjustment. Length over all, 6¾-inches.

Per dozen..$15.00

No. 4—Malleable Iron. Polished sides. Hardened steel anvil and plunger. Heavy spiral steel spring. For Champion or wide tooth cross-cut saws, 14 to 20 gauge. Length over all, 9½-inches.

Per dozen $20.60

Star Hack Saw Frames



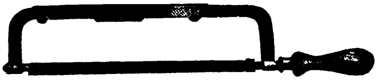
No. 4B—Fig. 918

No. 4B—This is a patent cast iron frame for 9-inch blades and so constructed as to face blades in four directions. The pins which hold the blade are fast in the frame and cannot drop out. It is a very stiff and desirable frame with Japan finish.

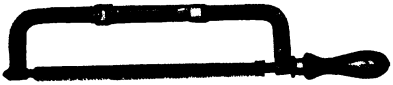
Per dozen........................$4.00

No. 9—This frame holds blades from 8 to 12-inches in length. It is an extension frame covered by a steel sheath. The sheath makes it very stiff, and at the same time very light. It is polished and nickel plated. The blades may be faced in four directions.

Per dozen.......................$15.00



No. 9—Fig. 919



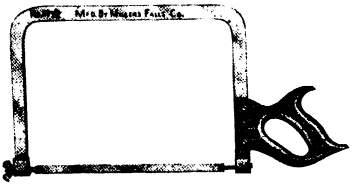
No. 10—Fig. 920

No. 10—This frame holds blades from 8 to 12-inches in length and is marked for the different lengths. It is an extension frame, light and quickly adjusted, having strength in the middle where strength is needed. It is made of tempered steel, polished and nickel plated. The handles are cocobolo wood, highly finished. The blades may be faced in four directions.

Per dozen...$15.50

No. 14—This frame is adapted for large work, such as cutting off rails, iron beams, girders, etc. Heavy forged steel frame, with solid sockets. Polished and nickel plated. Beechwood handle fastened with three nickel plated screws. Blades tightened by thumb screw. Measurement between back and saw points, 10¼-inches. Carries 12-inch blades and is not adjustable to other sizes.

Per dozen.....................$23.00



No. 14—Fig. 921

Simplex Power Hack Saws

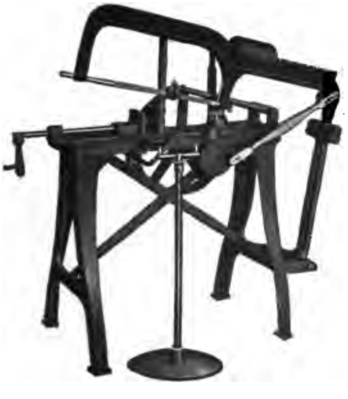


Fig. 922

This machine is designed for cutting off all kinds of metals, of any shape, and to sizes given below. A steady and uniform pressure is maintained on the saw during the forward stroke, while on the return stroke, the weight is lifted from the blade. When the work is finished the saw automatically lifts from the work and stops.

No. 1—Cuts off up to 4½-inch stock.
No. 2—Cuts off up to 6x8-inch stock.

Either size can be equipped with ½ H. P. motor.

Size of driving pulley	13x2-inches
Speed of pulley per minute	40 to 50 revolutions
Length of stroke	6-inches
Floor space	18x30-inches
Net weight, No. 1	155 pounds
Net weight, No. 2	165 pounds
Weight of crate, about	50 pounds
Weight of box, (two in box), 18x36x40-inches	150 pounds

Floor rest furnished when specially ordered, at extra cost.

Hack Saw Blades

Fig. 923

These blades are made of the finest grade of steel. The teeth are sharp, with square cutting points, set evenly and in such a manner that every tooth cuts. The set is just enough to insure a free, smooth, and rapid cut, removing no more stock than necessary. The blades are tempered by an improved process, which leaves them hard and tough, so that they will not shell off. They are too hard to file.

For general metal cutting we furnish our No. 112 Blades with 18 teeth to the inch. They are ⅝-inch wide and .030-inch thick. We have found that these blades are the correct width and thickness for general use.

Length ....inches	8	9	10	12
Price ....per gross	$9.00	9.60	10.20	12.60

For cutting tubing, brass, copper and thin sheets of metal we furnish our No. 102 Blades with 24 teeth to the inch. They are ½-inch wide and .025-inch thick.

Length ....inches	8	9	10	12
Price ....per gross	$8.00	9.00	10.00	12.00

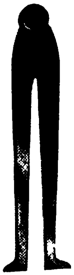
Power Hack Saw Blades

These blades are hardened throughout and are adapted especially for work in large power machines. They are ¾-inch wide and .032-inch thick, and furnished with 14 teeth to the inch. The lengths given refer to distance from center to center of holes.

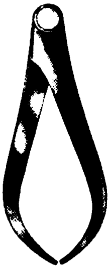
Length ....inches	12	13½	14	16	17
Price ....per gross	$15.00	18.00	18.00	21.00	22.20

Calipers

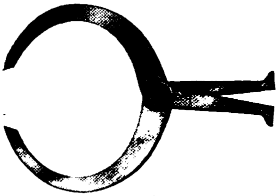
CAST STEEL—POLISHED



Inside
Fig. 924



Outside
Fig. 925



Double
Fig. 926

Length ....inches	4	6	8	10	12
Inside calipers....per dozen	$2.85	3.75	5.35	6.50	8.00
Outside calipers.... " "	2.85	3.75	5.35	6.50	8.00
Double calipers.... " "	4.25	6.00	.....	.....	.....

Wing Dividers

FORGED STEEL—POLISHED

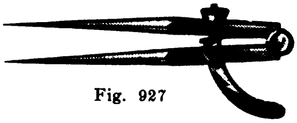
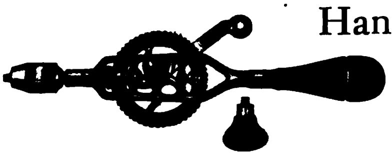


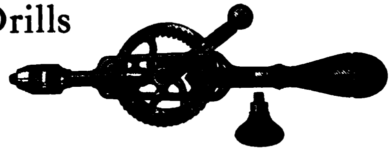
Fig. 927

Length ....inches	6	8	10	12
Price ....per dozen	$5.50	7.50	10.00	12.00

Hand Drills



No. 1—Single Geared
Fig. 928



No. 5—Double Geared
Fig. 929

No. 1—Japanned malleable iron frame. Japanned cast iron cut gears. Nickel plated steel chuck and handle crank. Cocobolo knob and handle. Handle with hollow end with screw cap large enough to contain drill points within the capacity of the tool. Three jaw chuck holding, and centering accurately, round shank drills from 0 to 3/16-inch in diameter.

Length over all, 12½-inches. Diameter of gear, 3⅛-inches. Length of handle, 4½-inches, with 8 cast steel fluted drill points ranging in size from 1/16 to 11/64-inch in diameter.

Weight per dozen.............20 pounds Price ....Per dozen $20.00

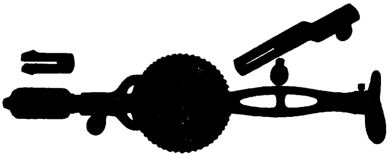
No. 5—Japanned malleable iron frame. Cast iron cut gears painted red. The large gear has a wide rim, enabling the operator to grasp the wheel by the rim instead of crank handle, thus giving a steady and uniform motion when delicate work is being done. This also reduces the liability to break the drill points. Nickel plated steel chuck and handle crank. Cocobolo knob and handle. Handle with hollow end with screw cap large enough to contain drill points within the capacity of the tool. Three jaw chuck holding, and centering accurately, round shank drills from 0 to 3/16-inch in diameter.

Length over all, 12½-inches. Diameter of gear, 3½-inches. Length of handle, 4½-inches, with 8 cast steel fluted drill points ranging in size from 1/16 to 11/64-inch in diameter.

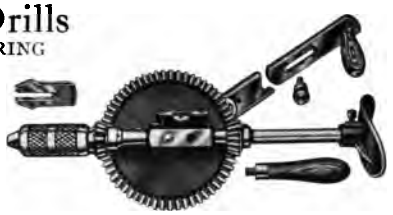
Weight per dozen.............22 pounds Price ....Per dozen $24.00

Breast Drills

BALL BEARING



No. 12 Improved—Single Geared
Fig. 930



No. 13—Double Geared
Fig. 931

No. 12 Improved—Malleable iron frame. Level attachment. Nickel plated steel chuck. Adjustable breast plate. Changeable gear, from even to a speed of 3 to 1. Adjustable crank to 8, 10 and 12-inch sweeps. "Master Chuck" holding round shank drills from ⅛ to ½-inch in diameter, all sizes of bit stock drills and No. 1 Taper Shank Drills.

Length over all, 17½-inches. Diameter of large gear, 5-inches. Diameter of small gear, 1⅞-inches.

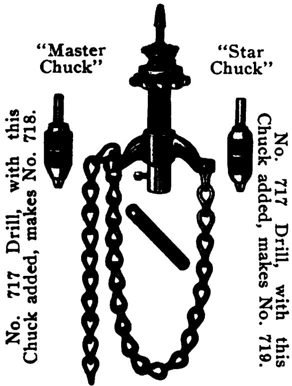
Weight per dozen.............79 pounds Price ....Per dozen $40.00

No. 13—Nickel plated steel frame, stock and chuck. Level attachment. Adjustable breast plate. Changeable gear, from even to a speed of 4½ to 1. Adjustable crank to 8, 10 and 12-inch sweeps. "Master Chuck" holding round shank drills from ⅛ to ½-inch in diameter, all sizes of bit stock drills and No. 1 Taper Shank Drills.

Length over all, 15-inches. Diameter of large gear, 6-inches. Diameter of small gear, 1⅜-inches.

Weight per dozen.............70 pounds Price ....Per dozen $55.00

Chain Drilling Attachments


"Master Chuck"
"Star Chuck"
No. 717 Drill, with this Chuck added, makes No. 718.
No. 717 Drill, with this Chuck added, makes No. 719.

No. 717 No Chuck
Fig. 932

Japanned cast iron yoke. Automatic self-regulating feed or may be fed by hand. Furnished with four feet of stout chain. Length of main spindle, 8½-inches.

No. 717—Chain Drilling Attachment, with plain socket, ½-inch hole with set screw.

Weight each, 3½ pounds. Price...............Each $1.60

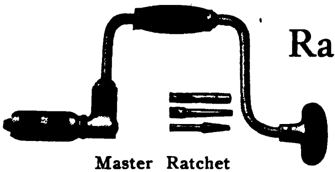
No. 718—Chain Drilling Attachment, same as No. 717, with "Master Chuck" added, for holding round shank drills from ⅛ to ½-inch in diameter, all sizes of bit stock drills and No. 1 Taper Shank Drills.

Weight each, 4½ pounds. Price...............Each $3.00

No. 719—Chain Drilling Attachment, same as No. 717, with "Star Chuck" added, for holding round shank drills from 0 to ½-inch in diameter.

Weight each, 4½ pounds. Price...............Each $4.00

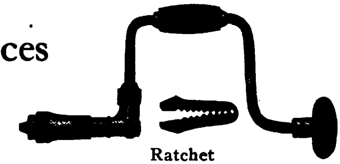
Ratchet Bit Braces



Master Ratchet
Fig. 933

Ball-bearing head and handle. Head and handle of cocobolo. Nickel plated bent steel shank. Forged steel jaws holding bits, round shank drills from ⅛ to ½-inch in diameter, all sizes of bit stock drills and No. 1 Taper Shank Drills.

Number	831	832	833
Sweep ....inches	12	10	8
Price ....per dozen	$36.00	34.00	32.00



Ratchet
Fig. 934

Brass rings inserted in sweep handle. Head and handle of hardwood stained in imitation of cocobolo. Nickel plated bent steel shank. Forged steel alligator pattern jaws.

Number	321	322	323
Sweep ....inches	12	10	8
Price ....per dozen	$18.50	17.50	16.50

Spofford's Bit Braces

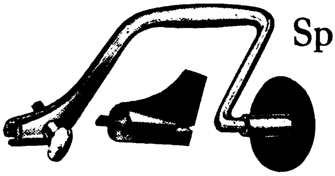


Fig. 935

Polished bent steel shank. Revolving iron head. Thumb screw forged from Bessemer steel.

Number	8	10	12	14
Sweep .....inches	8	10	12	14
Price....per dozen	$19.00	22.00	25.00	28.00

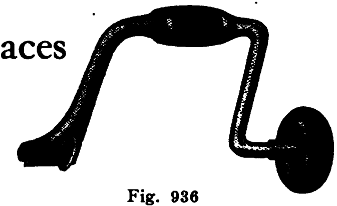


Fig. 936

Nickel plated bent steel shank. Cocobolo head and handle. Thumb screw forged from Bessemer steel.

Number	108	110
Sweep ....inches	8	10
Price...............per dozen	$24.00	27.00

Clark's Pattern Expansive Bits

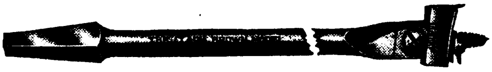


Fig. 937

Forged from tool steel, oil tempered, full polished.

No. 1—Small size, complete with cutters Nos. 1 and 2. Cuts from ½ to 1½-inch hole. Length over all, 8-inches ....Per dozen	$18.00
No. 2—Large size, complete with cutters Nos. 3 and 4. Cuts from ⅞ to 3-inch hole. Length over all, 10½-inches ....Per dozen (Nos. 5 and 6 Cutters can be used with this size only.)	26.00

EXTRA CUTTERS

Number	1	2	3	4	5	6
Cuts.........................inches	½ to ⅞	⅞ to 1½	⅞ to 1¾	1¾ to 3	3 to 4	4 to 5
Price ....per dozen	$3.00	3.75	5.25	6.00	9.00	12.00

Snell's Jennings Pattern Auger Bits

Forged from highest grade crucible steel. Oil tempered. Full polished. Double extension lips and cutters. Double thread on screw. Suitable for soft or hardwood.

Length of twist, 4½-inches.
Length over all, 8½-inches.

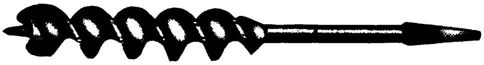


Fig. 938

Size in 16ths of an inch	3	4	5	6	7	8	9	10	11
Price ....per dozen	$4.50	4.00	4.00	4.00	4.50	5.00	5.50	6.00	7.00
Size in 16ths of an inch	12	13	14	15	16	17	18	19	20
Price ....per dozen	$7.00	8.00	8.00	9.00	9.00	10.50	10.50	12.00	12.00

Genuine Irwin Solid Center Auger Bits

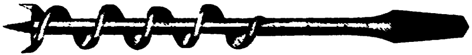


Fig. 939

Forged from tool steel. Oil tempered. Full polished. Double extension lips and cutters. Single thread on screw. Suitable for soft or hardwood.

Length of twist, 4½-inches. Length over all, 8½-inches.

Size in 16ths of an inch.....	3	4	5	6	7	8	9	10	11	12	13
Price............per dozen	$4.50	4.00	4.00	4.00	4.50	5.00	5.50	6.00	7.00	7.00	8.00
Size in 16ths of an inch.....	14	15	16	18	20	22	24	26	28	30	32
Price............per dozen	$8.00	9.00	9.00	10.50	12.00	13.50	15.00	17.00	19.00	21.00	23.00

Snell's Carpenters' Nut Augers

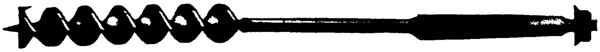


Fig. 940

Forged from highest grade crucible steel. Oil tempered. Full polished.

Size ....inches	½	⅝	¾	⅞	1	1⅛	1¼	1½	1¾	2
Price.................per dozen	$8.25	9.50	10.75	12.00	13.25	15.00	17.00	22.00	26.00	30.00

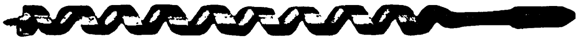


Fig. 941

Snell's Ship Augers

WITH SCREW

Forged from tool steel. Oil tempered. Polished twist and shank. Single thread on screw. Length of twist, about 12-inches. Length over all, about 18-inches.

Size in 8ths of an inch...........................	4	5	6	6½	7	7½	8
Price ....per dozen	$7.50	9.00	10.50	12.00	12.00	13.50	13.50
Size in 8ths of an inch...........................	8½	9	9½	10	12	14	16
Price ....per dozen	$15.00	15.00	16.50	16.50	21.00	27.50	38.00

Snell's Ship Augers

WITH SCREW

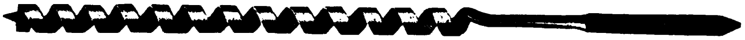


Fig. 942

Forged from tool steel. Oil tempered. Polished twist and shank. Single thread on screw. Length of twist, 18-inches. Length over all, 36-inches.

Size ....inches	½	⅝	¾	⅞	1	1$\frac{1}{16}$	1⅛	1¼	1⅜	1½	2
Price.........per dozen	$22.50	25.50	28.50	32.10	35.70	37.50	39.30	42.90	47.70	52.50	76.50

Genuine Irwin Solid Center Ship Augers

WITH SCREW

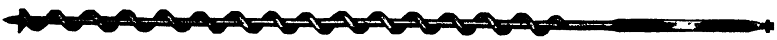


Fig. 943

Forged from tool steel. Oil tempered. Full polished. Double extension lips and cutters. Single thread on screw. Length of twist, 18-inches. Length over all, 36-inches.

Size in 16ths of an inch.............	8	10	11	12	13	14	15	16	17
Price......................per dozen	$24.00	27.90	30.30	31.80	34.50	36.30	39.00	40.80	43.50
Size in 16ths of an inch.............	18	20	22	24	26	28	30	32	.....
Price......................per dozen	$45.30	49.80	55.50	61.20	69.00	76.80	84.60	92.40	.....

Plumbs and Levels

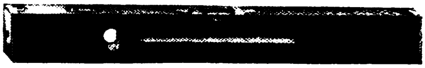


Fig. 944

No. 3—Stanley Adjustable, cherry, mahogany stained and polished, one piece stock. Brass arch top plate. Brass tips on each end. Two side views. Lengths 24, 28 and 30-inches.

Per dozen..$15.00

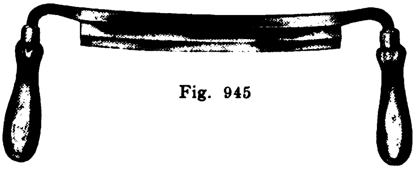


Fig. 945

Drawing Knives

CARPENTERS'

Razor blade, highest grade Jessop's cast steel, oil tempered, sharpened and polished. Hickory handles, heavy caps and ferrules.

Length of blade.....................inches	6	8	9	10	12
Price ....per dozen	$13.50	13.50	14.40	15.60	18.00

Fig. 946

Oil Stones

UNMOUNTED

Fig. 947

Lily White Washita Oil Stones and Round Edge Beveled Slips are the best general purpose stones on the market. A fast cutter and leaves a fine smooth edge.

No. 86—Lily White Washita Oil Stones, 6x2x1-inches.........	Per dozen $ 9.00
No. 88—Lily White Washita Oil Stones, 8x2x1-inches.........	Per dozen 12.00
No. 24—Lily White Washita Round Edge Beveled Slips, about 3½x1⅞-inches	Per dozen $4.00

Try Squares

No. 20—Rosewood handle, brass faced edges, and handy finger grooves. Blued steel blade, graduated in eighths.

Length of blade.......inches	4½	6	7½	9	10	12
Price ....per dozen	$2.70	3.60	4.15	5.10	5.50	6.70

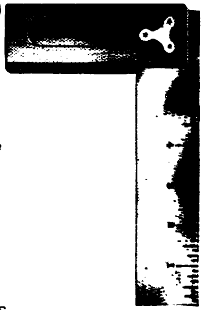


Fig. 948

Steel Squares

POLISHED

One piece weldless steel with plain cut markings.

Number	Body, Inches	Tongue, Inches	Graduations	Price, Per Dozen
3	24x2	16x1½	4ths, 8ths, 12ths, 16ths, Essex's Board and Brace Measure.......	$15.00
14	24x2	16x1½	4ths, 8ths, Essex's Board Measure..	12.75

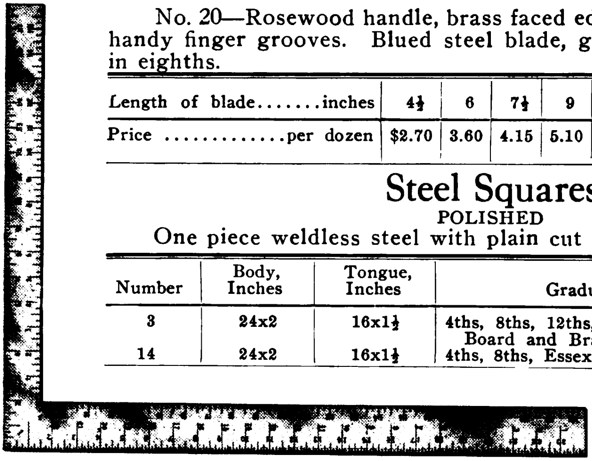
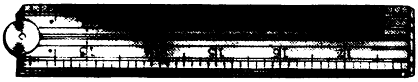


Fig. 949

Boxwood Rules



No. 68—Fig. 950

No. 62—Fig. 951

No. 61—Two foot, four fold, square joint, middle plates, graduated in inches, 8ths, 10ths, 12ths and 16ths, 1-inch wide............................Per dozen $3.00

No. 68—Two foot, four fold, round joint, middle plates, graduated in inches. 8ths and 16ths, 1-inch wide.......................................Per dozen $2.50

No. 62—Two foot, four fold, square joint, full brass bound, graduated in inches, 8ths, 10ths, 12ths, 16ths, drafting scale, 1-inch wide................Per dozen $8.00

No. 84—Two foot, four fold, square joint, half brass bound, graduated in inches, 8ths, 10ths, 12ths, 16ths, drafting scale, 1-inch wide...............Per dozen $6.50

"Home" Steel Tapes

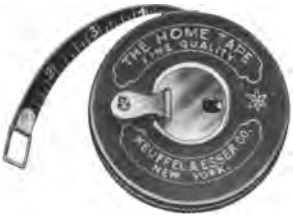


Fig. 952

These tapes are ⅜-inch wide, stout bent leather case, large center, long folding handle. Nickel plated mountings. Graduations begin at outside end of ring. These tapes are intended to supersede the woven tapes which on account of their low price are often used where a more reliable tape ought to be employed. They are of the best quality steel and accurately graduated.

GRADUATED IN 12THS

Size Number	7350T	7352T	7354T	7355T
Length in feet	25	50	75	100
Price each	$3.20	3.90	5.10	6.60

"Dartmouth" Metallic Tapes

These tapes are ⅝-inch wide, stout bent leather case, long folding handle. Nickel plated mountings. Line interwoven with metal, leather reinforced end. Graduations begin at outside end of ring.

GRADUATED IN 12THS

Size Number	7440T	7442T	7444T	7445T
Length in feet	25	50	75	100
Price each	$ 1.65	2.45	3.05	3.80
Price per dozen	$19.80	29.40	36.60	45.60

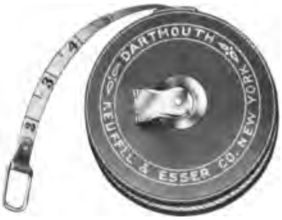


Fig. 953

"Favorite" Ass Skin Tapes

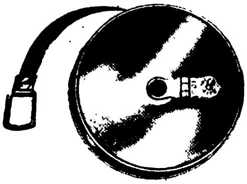


Fig. 954

Ass Skin case, brass bound, brass folding handle and trimmings, with ½-inch wide cotton line.

GRADUATED IN 12THS

Size Number	7900	7902	7904	7905
Length in feet	25	50	75	100
Price per dozen	$3.75	5.00	7.50	9.00

Price List of Files and Rasps

PRICE PER DOZEN

As Adopted by the File Manufacturers Association of the United States, November 1, 1899

INCH.	MILL AND ROUND.			FLAT.			INCH.	SQUARE.			HAND AND PILLAR.			INCH.	HALF RD. & THREE SQUARE.			WARDING.		
	Bastard.	2d Cut.	Smooth.	Bastard.	2d Cut.	Smooth.		Bastard.	2d Cut.	Smooth.	Bastard.	2d Cut.	Smooth.		Bastard.	2d Cut.	Smooth.	Bastard.	2d Cut.	Smooth.
4	3.00	3.50	3.90	3.70	4.30	4.70	4	3.80	4.60	4.90	3.70	4.30	4.80	4	4.80	5.60	6.10	4.00	4.80	5.40
5	3.20	3.80	4.10	3.90	4.60	4.90	5	4.10	4.80	5.30	3.90	4.70	5.30	5	5.40	6.10	6.40	4.50	5.30	5.80
6	3.50	4.00	4.50	4.30	4.80	5.30	6	4.60	5.10	5.50	4.30	5.10	5.60	6	6.10	6.70	7.10	4.90	5.90	6.40
7	3.90	4.60	4.90	4.80	5.50	6.10	7	5.10	5.80	6.30	4.90	5.80	6.30	7	7.00	7.70	8.20	5.90	6.90	7.50
8	4.30	4.90	5.40	5.30	6.10	6.60	8	5.50	6.80	7.00	5.40	6.30	6.70	8	7.50	8.30	8.90	6.40	7.50	8.20
9	4.90	5.80	6.30	6.30	7.20	7.90	9	6.00	7.70	8.30	6.70	7.80	8.30	9	8.50	9.40	9.90	7.80	9.00	9.90
10	5.60	6.40	7.00	7.00	8.10	8.70	10	7.40	8.50	9.10	7.50	8.70	9.40	10	9.10	10.10	10.70	8.70	10.10	11.00
11	6.70	7.80	8.50	8.60	9.80	10.70	11	9.10	10.40	11.30	9.40	10.90	11.80	11	10.70	11.80	12.70	10.90	12.70	13.70
12	7.50	8.60	9.40	9.70	11.00	12.10	12	10.20	11.50	12.80	10.70	12.30	13.50	12	11.80	13.00	13.90	12.30	14.30	15.40
13	9.40	10.70	11.70	11.80	13.60	14.70	13	12.50	14.30	15.40	13.30	15.20	16.20	13	14.10	15.40	16.60	15.20	17.40	18.70
14	10.70	12.20	13.10	13.30	15.30	16.70	14	13.90	16.10	17.50	15.00	17.00	18.20	14	15.50	17.00	18.30	17.00	19.40	21.00
15	13.10	15.00	16.10	16.00	18.30	20.00	15	16.90	19.20	20.90	17.90	20.60	21.70	15	18.50	20.40	21.70			
16	14.70	16.80	17.90	17.80	20.10	22.30	16	18.70	21.20	23.30	20.10	22.80	24.20	16	20.60	22.50	24.20			
17	18.20	20.20	21.70	21.50	24.20	26.50	17	22.50	25.40	27.50	24.20	27.10	28.60	17	24.70	27.00	28.90			
18	20.20	22.70	24.30	23.90	26.80	29.20	18	25.10	28.20	30.40	26.80	29.90	31.50	18	27.50	29.90	32.00			
19	24.60	27.50	29.40	28.40	31.60	34.60	19	29.70	33.20	35.70	31.90	35.40	37.60	19	32.80	35.70	38.10			
20	27.40	30.70	32.90	31.50	35.30	38.30	20	32.80	36.70	39.30	35.10	39.20	41.60	20	36.20	39.40	42.30			
Mill Blunt, Dbl. Cut, adv 2 in. Mill Dbl. Cut, " 1 " Mill Narrow Point, " 1 " Mill Machine, " 1 " Mill Triangular & Sq. " 1 " Farmers'Own, adv. on Bast. 1 "				Cant (Blunt) Dbl. Cut advance 2 in.			Square Blunt, advance 1 in.				Slotting (Blt.) adv. 2 in. Cotter Blunt or Taper advance 2 in. Reaper, Advance 1 in. on 2d Cut.			Ginsaw, take Bastard price. Crossing..........adv. 2 in. Tumbler.......... " 2 " Feather Edge (Blunt), " 2 " High Back, } Half Round, } .... " 2 "						

STAVESAW.

8 inch....... $9.40

STAVESAW IMPROVED.

6 inch.......	$ 6.40
7 "	7.40
8 "	8.10
9 "	9.70
10 "	10.70
12 "	15.40

INCH.	MILL, One Round Edge.			MILL, Two Round Edges.			INCH.	TAPERS.		SLIM TAPERS.		BANDSAW, Blunt & Taper.		INCH.	PIT SAW.	CANT SAW.	CROSS CUT.	HOOK TOOTH.	PLANER KNIFE.	INSERTED TOOTH or CHISEL TOOTH.
	Bastard.	2d Cut.	Smooth.	Bastard.	2d Cut.	Smooth.		Single Cut.	Double Cut.	Single Cut.	Double Cut.	Regular.	Slim.		Single Cut.	Single Cut.	Single Cut.	Single Cut.	Single Cut.	
4	3.40	3.90	4.40	3.80	4.40	4.90	3	2.10	2.50	2.10	2.50	2.50	2.50	4	4.80	4.30	4.80	......	......	......
5	3.60	4.30	4.60	4.00	4.80	5.10	3½	2.10	2.50	2.10	2.50	2.50	2.50	5	5.40	4.70	5.40	......	......	......
6	3.90	4.50	5.10	4.40	5.00	5.60	4	2.20	2.90	2.20	2.60	2.90	2.60	6	6.10	5.40	6.10	6.70	......	......
7	4.40	5.20	5.50	4.90	5.80	6.10	4½	2.40	3.10	2.30	3.00	3.10	3.00	7	7.00	6.10	7.00	7.70	......	......
8	4.80	5.50	6.10	5.40	6.10	6.80	5	2.60	3.50	2.50	3.20	3.50	3.20	8	7.50	6.40	7.50	8.30	6.40	8.30
9	5.50	6.50	7.10	6.10	7.30	7.90	5½	3.00	4.00	2.90	3.50	4.00	3.50	9	8.50	7.80	8.50	9.40	......	9.40
10	6.30	7.20	7.90	7.00	8.00	8.80	6	3.40	4.70	3.10	3.90	4.70	3.90	10	9.10	8.70	9.10	10.10	8.60	10.10
11	7.50	8.80	9.60	8.40	9.80	10.60	7	4.30	5.60	3.80	4.50	5.60	4.50	11	10.70	10.40	10.70	11.80	......	......
12	8.40	9.70	10.60	9.40	10.80	11.80	8	5.40	6.70	4.50	5.30	6.70	5.30	12	11.80	11.40	11.80	13.00	12.10	......
13	10.60	12.00	13.20	11.80	13.40	14 60	9	6.60	8.10	5.40	6.30	8.10	6.30							
14	12.00	13.70	14.70	13.40	15.30	16.40	10	8.10	9.70	6.40	7.50	9.70	7.50							
15	14.70	16.90	18.10	16.40	18 80	20.10	11	10.70	12.10	8.30	9.10	12.10	9.10							
16	16.50	18.90	20.10	18.40	21.00	22.40	12	12.50	14.70	9.50	11.00	14.70	11.00							
17	20.50	22.70	24.40	22.80	25.30	27.10	13	15.90	17.50	12.10	13.10	17.50	13.10							
18	22.70	25.50	27.30	25.30	28.40	30.40	14	18.20	20.60	13.80	15.40	20.60	15.40							

Climax, adv. 2 in. on Hlf. Rd. Bastard.
Round Gulleting, take Pitsaw price.

PATENT DOUBLE-ENDER WITH HANDLE.

7	8	9	10
3.50	3.90	4.40	4.90

INCH.	HORSE RASPS.			FILE RASPS.		INCH.	WOOD FILES.			WOOD RASPS.			INCH.	SHOE RASPS.			INCH.	KNIFE.		
	Plain.	Beveled & ¾ Rasp.	Tanged.	Flat.	Hlf. Rnd.		Flat.	Hlf. Rnd.	Cabinet.	Flat.	Hlf. Rnd.	Cabinet.		Flat.	Hlf. Rnd.	Oval.		Bastard.	2d Cut.	Smooth.
6	......	......	......	7.40	8.10	6	4.30	6.10	8.10	7.40	8.10	10.10	6	8.10	8.10	9.30	4	5.40	6.00	6.40
7	......	......	......	8.60	9.30	7	4.80	7.00	9.30	8.60	9.30	11.70	7	9.30	9.30	10.10	5	6.10	6.70	7.10
8	......	......	......	9.40	10.10	8	5.30	7.50	10.10	9.40	10.10	12.80	8	10.10	10.10	12.20	6	6.90	7.50	7.90
9	......	......	......	11 40	12.20	9	6.30	8.50	12.20	11.40	12.20	15.50	9	12.20	12.20	13.70	7	7.80	8.50	8.90
10	9 40	10.70	12.80	12.80	13.70	10	7.00	9.10	13.70	12.80	13.70	17.50	10	13.70	13.70	16.80	8	8.50	9.10	9.50
11	11.40	12.90	15.20	15 50	16.80	11	8.60	10.70	16.80	15.50	16.80	20.70	11	16.80	16.80	18.70	9	9.40	10.60	11.30
12	12.80	14.40	16.80	17.50	18.70	12	9.70	11.80	18.70	17.50	18.70	22.80	12	18.70	18.70	22.40	10	10.10	11.50	12.30
13	15.20	17.00	19.60	20.90	22.40	13	11.80	14.10	22.40	20.90	22.40	26.80	13	22.40	22.40	......	11	12.20	13.70	14.60
14	17.80	20.10	23.10	23.20	24.80	14	13.30	15.50	24.80	23.20	24.80	29.60	14	24.80	24.80	......	12	13.70	15.20	16.10
15	20.90	23.60	27.30	27.80	29.70	15	16.00	18.50	29.70	27 80	29.70	33.90					13	16.30	17.90	19.20
16	24.40	27.50	32.20	30.80	32.90	16	17.80	20.60	32.90	30.80	32.90	36.90					14	18.20	19.90	21.20
17	28.90	31.50	......	36.20	38.90	17	21.50	24.70	38.90	36.20	38.90	42.40								
18	32.90	36.20	......	40.90	43.60	18	23.90	27.50	43.60	40.90	43.60	46.90								

LASTMAKERS' RASPS.

One inch adv. on Cabinet Rasp.

Sizes below 4 inches, not extended, take 4 inch price.
Half Inches not specified, take next higher full inch price.
Dead Smooth, double the price of Bastard Cut.
One Round Edge, advance 12½ per cent.
All lengths above those listed, advance 20 per cent on next lower inch price.

Blunt Files not specified, advance one inch on respective kinds and cuts.
Single or Float Cut not specified, on regular shapes take Double Cut price.
Equalings (Bellied), advance two inches on respective kinds and cuts.
Two Round Edges, advance 25 per cent.
Files varying from standard sizes, subject to special prices.

Cuts not specified, made upon regular blanks, advance one inch on respective kinds and nearest cut.

Files and Rasps

MILL BASTARD

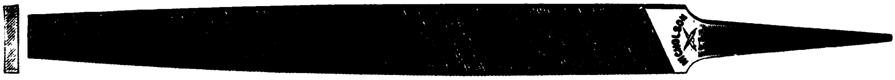


Fig. 955

FLAT BASTARD

Fig. 956

HALF-ROUND BASTARD

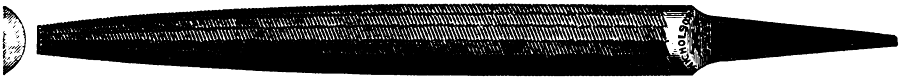


Fig. 957

ROUND BASTARD

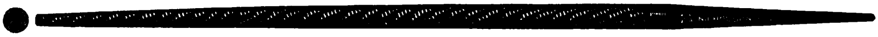


Fig. 958

SQUARE BASTARD

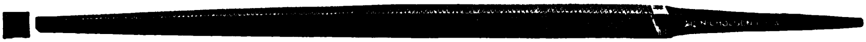


Fig. 959

WARDING BASTARD

Fig. 960

SLIM TAPER

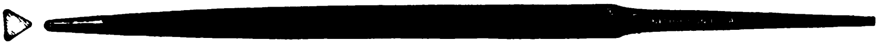


Fig. 961

HALF-ROUND WOOD RASPS

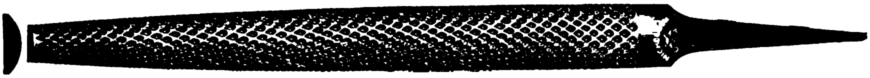


Fig. 962

Emery Wheels

Fig. 963

Made for all grades of work. Contains nothing but cutting material. Free from dust. Will not glaze or fill up.

In ordering, be careful to state diameter, thickness, size of mandrel hole, shape face, speed they are to run, and the purpose for which they are to be used.

All wheels thinner than ¼-inch are subject to the same list price as wheels of that thickness.

Diameter, Inches	THICKNESS OF WHEEL IN INCHES																	
	¼	⅜	½	⅝	¾	⅞	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	4
1	$.25	.30	.30	.35	.35	.40	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	1.00
1½	.30	.35	.40	.45	.45	.50	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.00	1.10
2	.35	.45	.50	.55	.55	.60	.60	.65	.70	.75	.80	.85	.90	.95	1.00	1.05	1.10	1.20
2½	.40	.55	.65	.70	.75	.80	.85	.95	1.05	1.15	1.25	1.35	1.45	1.55	1.65	1.75	1.85	2.05
3	.50	.65	.80	.90	.95	1.05	1.10	1.25	1.40	1.55	1.70	1.85	2.00	2.15	2.30	2.45	2.60	2.90
3½	.60	.80	.95	1.05	1.15	1.25	1.35	1.55	1.75	1.95	2.15	2.35	2.55	2.75	2.95	3.15	3.35	3.75
4	.75	.95	1.10	1.25	1.35	1.50	1.60	1.85	2.10	2.35	2.60	2.85	3.10	3.35	3.60	3.85	4.10	4.60
4½	.90	1.10	1.25	1.40	1.55	1.70	1.85	2.15	2.45	2.75	3.05	3.35	3.65	3.95	4.25	4.55	4.85	5.45
5	1.00	1.20	1.40	1.60	1.80	2.00	2.20	2.60	3.00	3.40	3.80	4.20	4.60	5.00	5.40	5.80	6.20	7.00
6	1.40	1.60	1.75	2.10	2.40	2.75	3.05	3.70	4.35	5.00	5.65	6.30	6.95	7.60	8.25	8.90	9.55	10.85
7	1.85	2.00	2.15	2.60	3.00	3.45	3.85	4.70	5.55	6.40	7.25	8.10	8.95	9.80	10.65	11.50	12.35	14.05
8	2.10	2.35	2.60	3.10	3.60	4.10	4.60	5.60	6.60	7.60	8.60	9.60	10.60	11.60	12.60	13.60	14.60	16.60
9	2.50	2.80	3.10	3.70	4.25	4.85	5.40	6.55	7.70	8.85	10.00	11.15	12.30	13.45	14.60	15.75	16.90	19.20
10	3.00	3.35	3.65	4.35	5.00	5.70	6.35	7.70	9.05	10.40	11.75	13.10	14.45	15.80	17.15	18.50	19.85	22.55
12	3.60	3.80	4.00	5.00	6.00	6.70	7.40	9.00	10.70	12.75	14.00	15.70	17.40	19.00	20.75	22.50	24.25	27.50
14	4.05	5.15	6.25	7.35	8.45	9.55	10.65	12.85	15.05	17.25	19.45	21.65	23.85	26.05	28.25	30.45	32.65	37.05
16	....	....	....	....	10.85	12.30	13.70	16.55	19.40	22.25	25.00	27.95	30.80	33.65	36.50	39.35	42.20	47.90
18	....	....	....	....	13.25	15.15	17.00	20.75	24.50	28.25	32.00	35.75	39.50	43.25	47.00	50.75	54.50	62.00
20	....	....	....	....	.....	.....	20.25	24.75	29.25	33.75	38.25	42.75	47.25	51.75	56.25	60.75	65.25	74.25
22	....	....	....	....	.....	.....	25.00	31.00	37.00	43.00	49.00	55.00	61.00	67.00	73.00	79.00	85.00	97.00
24	....	....	....	....	.....	.....	29.00	36.00	43.00	50.00	57.00	64.00	71.00	78.00	85.00	92.00	99.00	113.00

REVOLUTIONS PER MINUTE FOR SPEED OF 5000 FEET

Diameter ....inches	1	1½	2	2½	3	3½	4	4½	5	6	7
Revolutions per minute.......	19099	12733	9549	7639	6366	5457	4775	4244	3820	3183	2728
Diameter ....inches	8	9	10	12	14	16	18	20	22	24	....
Revolutions per minute.......	2387	2122	1910	1592	1364	1194	1061	955	868	796	....

The medium of 5000 feet is usually employed in ordinary work, but in special cases it is sometimes desirable to run them at a lower or higher rate, according to requirements.

Emery Cylinders

Fig. 964

We are prepared to furnish all kinds of special wheels, for grinding marble, glass or any material.

Emery Cylinders, Emery Cup Wheels and Brown and Sharpe Shapes furnished to order and shipped from factory only.

Emery Cup Wheels

Fig. 965

Emery Grinders

These grinders are well made of the best material. The No. 1 machines are made with dust-proof oilers and adjustable bearings. The Nos. 2, 3 and 4 machines have good adjustable rests, babbitted bearings and dust-proof brass oil cups.

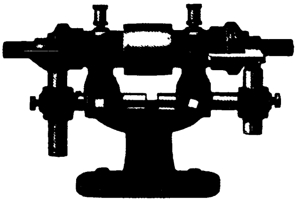


Fig. 966

Size Number	Height to Center of Spindle, Inches	Length of Spindle, Inches	Length of Bearings, Inches	Diameter of Bearings, Inches	Diameter Between Collars, Inches	Opening Between Collars, Inches	Diameter of Collars, Inches	Diameter of Pulley, Inches	Face of Pulley, Inches	Size of Base, Inches	Weight, Pounds	Price, Each
1	5	10 3/4	1 7/8	5/8	1/2	1	2	2	1 1/2	4 1/4x5 1/4	9	$ 5.00
2	6	13 1/2	2	7/8	3/4	1 1/2	2 3/8	2 1/4	2	5 3/8x6 3/8	18	10.00
3	7 1/2	18 1/4	3 1/4	1 1/16	1	2 1/4	3 1/2	3 1/2	2 1/2	10 1/8x6 1/4	40	15.00
4	8 1/2	26 1/2	4 3/4	1 3/8	1 1/4	3	4 1/2	5	4	11 3/8x8	75	20.00

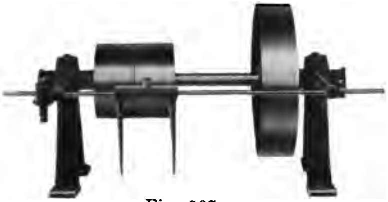


Fig. 967

Counter Shafts

The sizes of the pulleys are adapted for use with the Emery Grinders shown above.

Size Number	Diameter of Shaft, Inches	Length of Shaft, Inches	Tight and Loose Pulleys, Inches	Drive Pulley, Inches	Drop of Hangers, Inches	Weight, Pounds	Price, Each
1	7/8	18	4x1 3/4	8x1 7/8	5	25	$ 5.00
2	1	20	5x2 1/4	10x2 1/4	6	36	7.50
3	1 1/8	24	6x3	12x3	7 1/2	50	10.00
4	1 1/4	30	6x4 1/2	16x4	9	85	15.00

Grindstones

BI-TREADLE

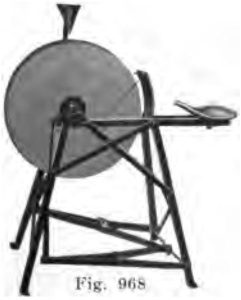


Fig. 968

Ball bearing. Mounted with a specially selected stone. Strong and compact. Steel folding frame firmly riveted and braced. The duplex pedals make it possible to run the stone at a speed nearly double that obtained with a crank. Weight, complete, 100 lbs.

Price....................Each $6.00

Shipped knocked down and crated.

UNMOUNTED

Fig. 969

Weight—Under 40 pounds....Per pound......

Weight—40 to 200 pounds....Per pound......

Weight—Over 200 pounds....Per pound......

All stones over 200 pounds are sold by measurement weight, less than 200 pounds, by cut weight, which is actual weight on scales as they come from the lathe and is cut on the stone.

Stones are not crated unless so ordered, in which case we add actual cost of so doing.

Screw Drivers

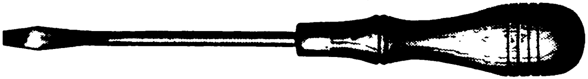


Fig. 970

"EAGLE"—No. 10

Cherry handle, nickel plated ferrule. Best forged cast steel blade.

Length of blade.......................inches	3	4	5	6	7	8	10	12
Diameter of rod.......................inches	3/16	1/4	1/4	5/16	5/16	3/8	3/8	3/8
Price ....per dozen	$3.00	3.60	4.20	4.80	5.90	6.50	8.00	10.00

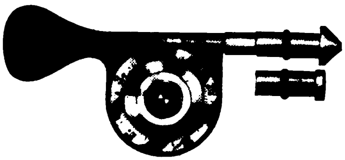


Fig. 971

Speed Indicators

STARRETT'S

No. 104—Nickel plated cast steel frame. Fitted with rubber tips for pointed and hollow centers. Working parts incased in frame. Registers 100 revolutions. Length over all, 5¼-inches.

In Pasteboard Box........	Each $1.00
In Leatherette Case.......	Each 1.50

Screw Pitch Gauges

No. 40—This gauge has 22 pitches, viz.: 9, 10, 11, 11½, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40. A late improvement consists in stamping on each leaf decimals, showing the double depth of thread on said leaf and this of course equals the depth of threads on the two sides of a tap having the same pitch.

Price......................Each $1.00

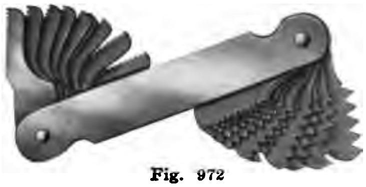


Fig. 972

No. 4—This gauge has 24 pitches, viz.: 4, 4½, 5, 5½, 6, 7, 8, 9, 10, 11, 11½, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30. Like No. 40, it can be used inside of a nut as well as on outside of a screw or bolt. It is also a convenient and reliable tool to use as a 60-degree center gauge and gauge to test the grinding of either an inside or outside threading tool.

Price...Each $1.25

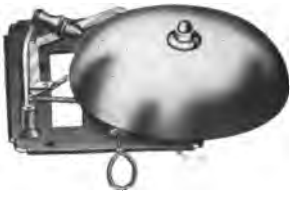


Fig. 973

Locomotive Gong Bells

ALL WOOD HAMMERS

Polished Bell Metal

Diameter ....inches	4	5	6	7	8	10	12
Price ....per dozen	$12.50	16.50	24.00	34.00	46.00	84.00	150.00

Goodyear Load Binders

For securely binding loads of ties, logs, lumber, pipe, sucker rods, and in fact any load that requires binding with a chain.

Price................Per pair $5.00

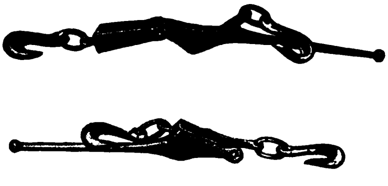


Fig. 974

Copper Rivets and Burrs

Fig. 975

UNIFORM LENGTHS

Number	Length in Inches	Size Package, Pound	Price, Per Pound
7	3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/8	1	$0.49
7	3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/8	1/2	.52
8	1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/8, 1 1/4, 1 1/2	1	.50
8	1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/8	1/2	.53
9	1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1	1	.52
9	1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1	1/2	.55
10	1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1	1	.54
10	1/4, 3/8, 1/2, 5/8, 3/4	1/2	.57
12	1/4, 3/8, 1/2, 5/8, 3/4	1	.58
14	1/4 only	1	.65

Rivet Sets

FARMERS' PATTERN

Number	7	8	9	10
For copper rivets..number	7	8	9	10 & 11
Price..........per dozen	$5.00	5.00	5.00	5.00

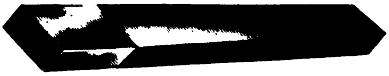


Fig. 976

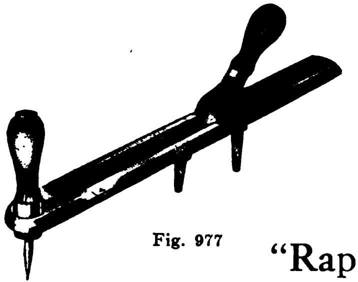


Fig. 977

Hargrave Washer Cutters

This tool is adapted to cutting gaskets from 4 to 20-inches in diameter.

The knives are of the best steel and well tempered. The center pin is also of steel.

The cutter is Japanned, polished, and has a gauge.

Price ....Per dozen $18.00
Extra Knives........Per dozen 3.00

"Rapid" Tap Plugs

REPAIRS
LEAKS IN BOILERS, TANKS,
SOIL PIPES, WROUGHT IRON
PIPES, FITTINGS, ETC.

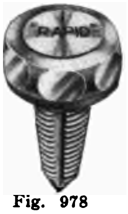


Fig. 978

MAKING
AN INSTANT AND
PERMANENT REPAIR.
ABSOLUTELY GUARANTEED.

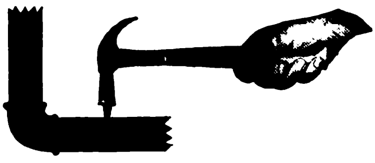


Fig. 979
"Hit with Hammer"

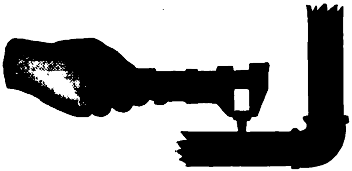


Fig. 980
"Screw Down"

Recess in head, thereby positively preventing gasket from blowing out.

Makes and taps its own hole. No drilling or tapping required. Start the point of plug with a hammer, then screw down with any kind of a wrench.

Made of tempered tool steel, with threads perfectly machined. The milled slot gives a sharp cutting edge, making possible the combination of drill, tap and plug.

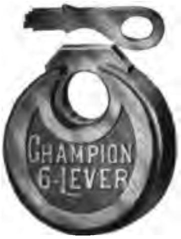
Many expensive inconveniences causing loss of time and property may be prevented by having on hand a supply of these plugs.

In repairing cast iron pipe or fittings it is more satisfactory to drill a hole large enough to catch the threads, on account of the danger of splitting.

Number	Size of Thread, Inches	Diameter of Head, Inches	Price, Per Dozen
1	5/16	5/8	$3.50
2	3/8	11/16	3.50
3	7/16	13/16	4.00
4	1/2	7/8	4.00
5	9/16	15/16	4.25

Padlocks

"CHAMPION" SIX LEVER PADLOCKS



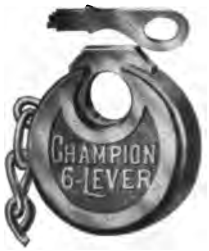
No. 1
Fig. 981

Cast from gun metal, much harder and tougher than bronze. The springs are of gun metal and will not rust or give out under the action of any climate. The keys are steel, nickel plated and polished.

Size, 2¼-inches

No. 1—Natural finish. Key changes unlimited. Two nickel plated flat steel keys to each lock, per dozen....$9.00

No. 10—Natural finish, with 8-inch steel chain. Key changes unlimited. Two nickel plated flat steel keys to each lock, per dozen...............$10.50

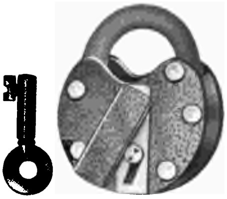


No. 10
Fig. 982

WAREHOUSE PADLOCKS

RAILWAY SWITCH AND CAR PADLOCKS

WAREHOUSE LOCK



No. 0039
Fig. 983

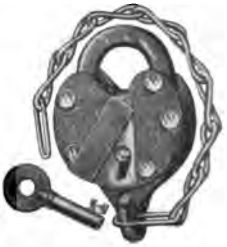
Made from bronze, with springs of bronze and not liable to clog by exposure to dirt, grit or snow. No. 039 made to order, to pass the standard keys of leading American railways. Orders should be accompanied by a sample key.

Size, 2½-inches

No. 0039—With one key to each lock, per dozen..................$10.80
Extra Keys, per dozen......... 1.80
No. 039—With 9-inch steel chain, no keys, per dozen.............$10.80
Extra Keys, per dozen......... 1.80

12 Key Changes

RAILWAY SWITCH AND CAR LOCK



No. 039
Fig. 984

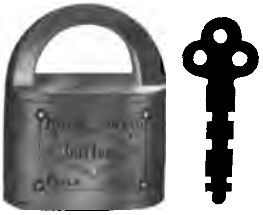


Fig. 985

"GILT EDGE" PADLOCKS

Wrought steel case finished in dark gun metal with brass plated malleable iron shackle. The top, bottom and interior parts are of bronze. Each lock furnished with two nickel plated corrugated steel keys.

No. 3—Size, 1¾-inches, per dozen........$6.00
No. 4—Size, 2 -inches, per dozen........ 7.80

12 Key Changes

"SCANDINAVIAN" PADLOCKS

Made from bronze. Three tumblers. Attractively finished in bright raised figures upon a black embossed ground work. Each lock furnished with two nickel plated flat steel keys.

No. 999—Size, 1⅝-inches, per dozen......$7.20

6 Key Changes

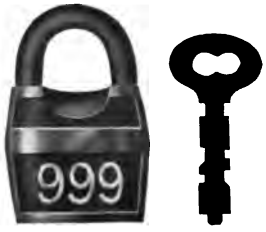


Fig. 986

Padlocks

"ELEPHANT" PADLOCKS

Black enameled wrought steel case. Nickel plated malleable iron self-locking spring shackle. Each lock furnished with two nickel plated flat steel keys.

No. 105—Size, 1⅞-inches, per dozen.. $3.60
No. 110—Size, 2¼-inches, per dozen.. 4.20

12 and 24 Key Changes respectively

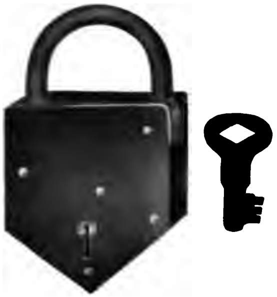


Fig. 987

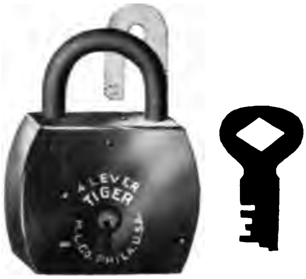


Fig. 988

"TIGER" PADLOCKS

Black enameled wrought steel case. Nickel plated malleable iron self-locking spring shackle. Four brass levers. All interior parts made of brass. Each lock furnished with two nickel plated flat steel keys.

No. 76—Size, 2-inches, per dozen......$4.20

12 Key Changes

Yale Padlocks

"STANDARD" PADLOCKS

Heavy cast bronze case with polished raised surfaces. Cast bronze polished self-locking spring shackle. All interior parts made of bronze. Four tumblers. Each lock furnished with two nickel plated flat steel keys.

No. 853—Size, 2-inches, per dozen....$31.00

144 Key Changes

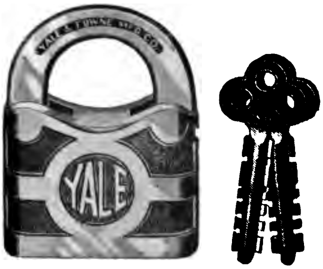


Fig. 989

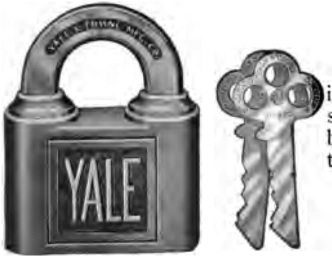


Fig. 990

"IRONSIDES" PADLOCKS

Heavy cast iron case, Bower-Barff rustless finish. Cast bronze polished self-locking spring shackle, swings both ways. All interior parts made of bronze. Four tumblers. Each lock furnished with two nickel plated flat steel keys.

No. 805F—Size, 2-inches, per dozen..$17.90

144 Key Changes

"MONITOR" PADLOCKS

Heavy wrought steel seamless case, Bower-Barff rustless finish, brass caps, brass rivets, forged steel self-locking spring shackle. Four tumblers. Each lock furnished with two nickel plated corrugated steel keys.

No. 8454—Size, 2-inches, per dozen...$20.85

144 Key Changes

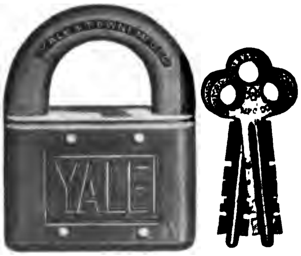


Fig. 991

Coil or Cable Chain

STRAIGHT LINK PROOF

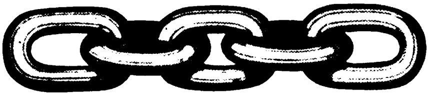


Fig. 992

Safe working load should be about one-half the proof test. Breaking strain is double the proof test.

Size .... inches	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
Proof test.... pounds	1000	1500	2600	3600	4500	6500	9500	13500	18500	24000
Average weight per 100 feet.... pounds	46	75	110	155	200	260	400	590	800	1000
Black .... per pound	$0.17	.11	.10	.09	.08	.08	.07	.07	.07	.07

Wrought Steel Tee and Strap Hinges

PLAIN

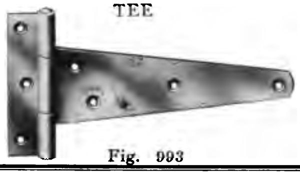


Fig. 993

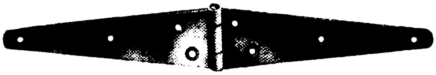


Fig. 994

Length of strap.... inches	4	5	6	8	10	12
Tee hinges—light .... per dozen pairs	$0.80	1.00	1.20	1.50	2.20	3.00
Tee hinges—heavy .... " " "	.90	1.05	1.25	1.55	2.30	3.20
Tee hinges—extra heavy .... " " "	1.80	2.45	3.00	5.00	7.40	10.70
Strap hinges—light .... " " "	1.10	1.35	1.70	2.40	3.30	4.90
Strap hinges—heavy .... " " "	1.60	2.15	2.80	4.50	6.80	10.40

Hasps and Staples Hook Hasps and Staples

WROUGHT STEEL—PLAIN

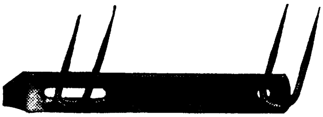


Fig. 995

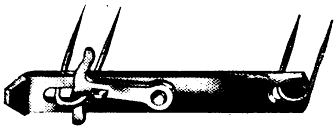


Fig. 996

Length .... inches	5	6	7	8	9	10
Hasps and staples.... per dozen	$0.90	1.00	1.10	1.30	1.70	2.00
Hook hasps and staples.... " "	1.20	1.40	1.60	1.80	2.20	2.50

Wrought Steel Staples

PLAIN

Length .... inches	1	1¼	1½	1¾	2	2¼	2½	3	3½	4
Price .... per gross	$1.20	1.20	1.25	1.50	1.70	2.00	2.35	3.20	3.70	5.25

Wrought Steel Hinge Hasps

PLAIN

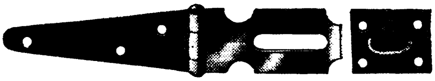


Fig. 997

Length of strap.... inches	3	4½	6	8	10	12
Price .... per dozen	$0.50	.60	.80	1.05	1.50	2.10

Flint Paper and Emery Cloth

FLINT PAPER

Number	000	00	0	½	1	1½	2	2½	3	Assorted
In sheets 9x11-inches........per ream	$6.25	6.25	6.25	6.25	6.75	7.25	7.75	8.25	9.50	7.25

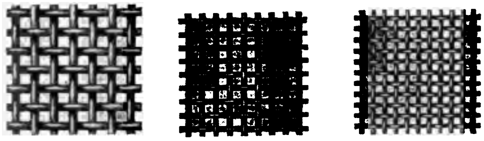
One-half ream in a package.

EMERY CLOTH

Number	Crocus	00	0	½	1	1½	2	2½	3	Assorted
In sheets 9x11-inches.per ream	$26.50	26.50	26.50	26.50	28.50	29.75	30.75	33.00	35.25	28.50

One-quarter ream in a package.

Mining Wire Cloth



Double Crimped—Fig. 998

FOR ALL KINDS OF
ORE SCREENING IN BATTERY,
JIG AND CONCENTRATOR WORK

It is of the utmost importance that wire cloth for this purpose should be perfect in every way, the wire tough and of the best selected stock, the crimp even, the mesh regular and the roll straight and free from buckles.

The wire used in the manufacture of this cloth is made from the highest grade of stock.

Following we itemize sizes carried in stock, but are prepared to furnish wire cloth in all sizes and grades on short notice. In ordering, be particular to state length, width, mesh and wire wanted.

STEEL MINING WIRE CLOTH

24-inches Wide, 16 Mesh, .025 Wire.
24-inches Wide, 20 Mesh, .023 Wire.
24-inches Wide, 20 Mesh, .018 Wire.
24-inches Wide, 24 Mesh, .018 Wire.
24-inches Wide, 30 Mesh, .015 Wire.
24-inches Wide, 35 Mesh, .0135 Wire.
24-inches Wide, 40 Mesh, .0135 Wire.
24-inches Wide, 40 Mesh, .013 Wire.
24-inches Wide, 40 Mesh, .011 Wire.
24-inches Wide, 50 Mesh, .0095 Wire.
28-inches Wide, 24 Mesh, .017 Wire.
28-inches Wide, 24 Mesh, .014 Wire.

BRASS MINING WIRE CLOTH

24-inches Wide, 18 Mesh, .025 Wire.
24-inches Wide, 20 Mesh, .023 Wire.
24-inches Wide, 40 Mesh, .013 Wire.
30-inches Wide, 40 Mesh, .013 Wire.

PRICES UPON APPLICATION.

Brass and Steel Balls

SOLID BRASS BALLS

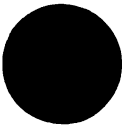


Fig. 999

Size, Inches	Price, Per 1000
⅞	$130.00
1	160.00
1⅛	200.00
1¼	280.00
1½	500.00
1¾	700.00

FINISHED TOOL STEEL BALLS

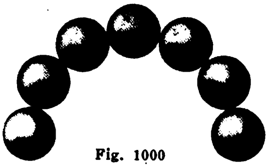


Fig. 1000

Size, Inches	Price, Per 1000	Size, Inches	Price, Per 1000
3/16	$2.40	¾	$ 96.00
¼	4.00	⅞	130.00
5/16	8.00	1	160.00
⅜	14.00	1⅛	200.00
7/16	24.00	1¼	280.00
½	36.00	1½	500.00
⅝	68.00	1¾	700.00
11/16	80.00	2	1000.00

Awning Pulleys

SINGLE
JAPANNED CAST IRON—SOLID EYE

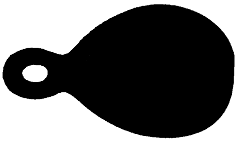


Fig. 1001

Size ....inches	2	2½
Price ....per dozen	$1.85	3.30

Rubber Belting

Canvas Belting

Cotton Belting

Leather Belting

Belting Accessories

Wood Split Pulleys

Pressed Steel Pulleys

Cast Iron Pulleys

Transmission Equipment

Transmission Equipment Dimensions

Pages 356 to 383 Inclusive

Rubber Belting

Fig. 1002

PRICE PER LINEAL FOOT

LIST ADOPTED APRIL 26th, 1910—EFFECTIVE MAY 2nd, 1910

Width, Inches	2-Ply	3-Ply	4-Ply	5-Ply	6-Ply	7-Ply	8-Ply
	Equal to Light Single Leather	Equal to Medium Single Leather	Equal to Heavy Single Leather	Equal to Light Double Leather	Equal to Medium Double Leather	Equal to Heavy Double Leather	Equal to Triple Leather
1	$0.09	$0.11	$0.13	.....	.....	.....	.....
1¼	.11	.13	.16	.....	.....	.....	.....
1½	.13	.15	.19	$0.23	.....	.....	.....
1¾	.15	.17	.22	.27	.....	.....	.....
2	.18	.20	.25	.31	$0.37	.....	.....
2½	.22	.25	.31	.38	.46	.....	.....
3	.26	.30	.37	.45	.55	.....	.....
3½	.30	.35	.43	.53	.65	.....	.....
4	.34	.40	.50	.61	.75	$0.86	.....
4½	.38	.45	.55	.69	.84	.96	.....
5	.42	.50	.61	.76	.91	1.06	.....
6	.50	.60	.72	.89	1.08	1.25	$1.44
7	.59	.70	.84	1.04	1.25	1.46	1.68
8	.67	.80	.96	1.19	1.44	1.68	1.92
9	.76	.90	1.07	1.34	1.60	1.88	2.16
10	.84	1.00	1.20	1.49	1.77	2.09	2.40
11	.92	1.10	1.32	1.63	1.96	2.29	2.62
12	1.00	1.20	1.43	1.78	2.15	2.50	2.85
13	1.10	1.30	1.56	1.95	2.34	2.73	3.12
14	1.19	1.40	1.69	2.11	2.54	2.96	3.39
15	1.28	1.52	1.83	2.28	2.74	3.19	3.65
16	1.37	1.65	1.96	2.44	2.94	3.42	3.92
18	1.55	1.87	2.22	2.77	3.33	3.88	4.44
20	1.74	2.09	2.49	3.10	3.73	4.35	4.97
22	1.94	2.33	2.77	3.47	4.16	4.85	5.54
24	2.16	2.60	3.08	3.85	4.62	5.39	6.16
26	2.38	2.86	3.39	4.23	5.08	5.93	6.78
28	2.60	3.12	3.70	4.62	5.54	6.47	7.39
30	2.82	3.39	4.00	5.00	6.00	7.00	8.00
32	3.04	3.65	4.31	5.39	6.47	7.55	8.62
34	3.26	3.92	4.62	5.78	6.93	8.09	9.24
36	3.48	4.18	4.93	6.16	7.39	8.62	9.86
38	3.70	4.44	5.24	6.55	7.85	9.16	10.47
40	3.92	4.71	5.55	6.93	8.32	9.70	11.09
42	4.14	4.97	5.85	7.32	8.78	10.24	11.70
44	4.36	5.24	6.16	7.70	9.24	10.78	12.32
46	4.58	5.50	6.47	8.08	9.70	11.32	12.94
48	4.80	5.76	6.73	8.47	10.16	11.86	13.55
50	5.02	6.03	7.08	8.85	10.63	12.40	14.17
52	5.22	6.29	7.39	9.24	11.09	12.94	14.78
54	5.46	6.56	7.70	9.63	11.55	13.48	15.40
56	5.68	6.82	8.01	10.01	12.01	14.01	16.02
58	5.90	7.08	8.32	10.40	12.47	14.55	16.63
60	6.12	7.35	8.62	10.78	12.94	15.09	17.25

To measure belting, use a steel tape (other kinds are not reliable) drawn tightly. Endless belts made to order.

Canvas Belting

Fig. 1003

We carry in stock the celebrated "Sawyer Brand" of stitched Canvas Belting. Manufactured by improved methods, which not only renders this belting impervious to the action of water, steam, oils and gases, unaffected by extreme heat or cold, but permits the retention of their natural elasticity and flexibility until the belts are entirely worn out.

Endless canvas and thresher belts can be furnished on short notice.

PRICE PER LINEAL FOOT

LIST ADOPTED OCTOBER 1st, 1912

Width, Inches	4-Ply	6-Ply	8-Ply	10-Ply
	Equal to Single Leather	Equal to Double Leather	Equal to Heavy Double Leather	Equal to Triple Leather
1	$0.12	.....	.....	.....
1½	.18	.....	.....	.....
2	.24	$0.36	.....	.....
2½	.30	.45	.....	.....
3	.35	.53	.....	.....
3½	.39	.59	.....	.....
4	.43	.65	$0.86	.....
4½	.47	.71	.94	.....
5	.51	.77	1.02	.....
6	.60	.90	1.20	.....
7	.70	1.05	1.40	.....
8	.80	1.20	1.60	.....
9	.90	1.35	1.80	.....
10	1.00	1.50	2.00	.....
11	1.10	1.65	2.20	.....
12	1.20	1.80	2.40	$3.00
13	1.43	2.15	2.86	3.58
14	1.54	2.31	3.08	3.85
15	1.65	2.48	3.30	4.13
16	1.76	2.64	3.52	4.40
18	1.98	2.97	3.96	4.95
20	2.20	3.30	4.40	5.50
22	2.42	3.63	4.84	6.05
24	2.64	3.96	5.28	6.60
26	3.12	4.68	6.24	7.80
28	3.36	5.04	6.72	8.40
30	3.60	5.40	7.20	9.00
32	3.84	5.76	7.68	9.60
34	4.08	6.12	8.16	10.20
36	4.32	6.48	8.64	10.80

To measure belting, use a steel tape (other kinds are not reliable) drawn tightly.

Cotton Belting

SOLID WOVEN

This Belting is largely used for elevating and conveying purposes and for the transmission of power where the work required is of a light character. It is formed by weaving successive layers of duck solid in one body and is thoroughly stretched. It is not affected by extremes of temperature or the action of acids. We handle the very best grade on the market.

PRICE PER LINEAL FOOT

Width, Inches	2-Ply	3-Ply	4-Ply	5-Ply	6-Ply	8-Ply
1	$0.04	.....	.....	.....	.....	.....
1½	.05	$0.06	.....	.....	.....	.....
2	.06	.08	$0.12	.....	.....	.....
2½	.06½	.10	.14	.....	.....	.....
3	.07	.12	.16	.....	.....	.....
3½	.08	.14	.18	.....	.....	.....
4	.09	.15	.21	$0.34	.....	.....
4½	.11	.17	.24	.36	.....	.....
5	.13	.19	.26	.38	.....	.....
5½	.15	.21	.28	.40	.....	.....
6	.17	.23	.30	.42	$0.46	$0.75
7	.19	.27	.34	.45	.51	.83
8	.21	.31	.38	.50	.57	.91
9	.23	.35	.44	.56	.66	1.03
10	.26	.39	.50	.63	.75	1.15
11	.30	.45	.55	.69	.85	1.30
12	.33	.48	.60	.75	.90	1.35
14	.41	.60	.75	.94	1.12	1.65
16	.49	.72	.90	1.12	1.35	1.95
18	.57	.82	1.00	1.28	1.50	2.13
20	.61	.90	1.15	1.44	1.72	2.33
22	.65	1.00	1.35	1.62	1.94	2.60
24	.69	1.10	1.55	1.80	2.16	2.85
26	.....	.....	1.75	2.00	2.36	3.15
28	.....	.....	1.90	2.15	2.60	3.35
30	.....	.....	2.10	2.35	2.85	3.60

To measure belting, use a steel tape (other kinds are not reliable) drawn tightly.

Leather Belting

Fig. 1004

The widely different kinds of work for which leather belting is used, has resulted in the introduction of numerous grades, each possessing special advantages for the particular duty it is called upon to perform. When ordering, it is advisable to state the nature of the work for which the belting is intended.

We carry in stock five grades of Leather Belting and are prepared to furnish the proper belt for your requirements.

PRICE PER LINEAL FOOT

LIST ADOPTED NOVEMBER 21st, 1906

Width, Inches	Single	Double	Width, Inches	Single	Double	Width, Inches	Single	Double
½	$0.12	$0.24	6	$1.44	$2.88	25	$6.00	$12.00
⅝	.15	.30	6½	1.56	3.12	26	6.24	12.48
¾	.18	.36	7	1.68	3.36	27	6.48	12.96
⅞	.21	.42	8	1.92	3.84	28	6.72	13.44
1	.24	.48	9	2.16	4.32	29	6.96	13.92
1¼	.30	.60	10	2.40	4.80	30	7.20	14.40
1½	.36	.72	11	2.64	5.28	32	7.68	15.36
1¾	.42	.84	12	2.88	5.76	34	8.16	16.32
2	.48	.96	13	3.12	6.24	36	8.64	17.28
2¼	.54	1.08	14	3.36	6.72	38	9.12	18.24
2½	.60	1.20	15	3.60	7.20	40	9.60	19.20
2¾	.66	1.32	16	3.84	7.68	42	10.08	20.16
3	.72	1.44	17	4.08	8.16	44	10.56	21.12
3¼	.78	1.56	18	4.32	8.64	46	11.04	22.08
3½	.84	1.68	19	4.56	9.12	48	11.52	23.04
3¾	.90	1.80	20	4.80	9.60	50	12.00	24.00
4	.96	1.92	21	5.04	10.08	52	12.48	24.96
4½	1.08	2.16	22	5.28	10.56	54	12.96	25.92
5	1.20	2.40	23	5.52	11.04	56	13.44	26.88
5½	1.32	2.64	24	5.76	11.52	60	14.40	28.80

To measure belting, use a steel tape (other kinds are not reliable) drawn tightly. Endless belts made to order.

SOLID ROUND LEATHER BELTING

Fig. 1005

TWIST LEATHER BELTING

Fig. 1006

SOLID ROUND LEATHER BELTING

⅛-inches in diameter	per foot	$0.07
3/16-inches in diameter	" "	.09
¼-inches in diameter	" "	.14
5/16-inches in diameter	" "	.18
⅜-inches in diameter	" "	.24

TWIST LEATHER BELTING

⅛-inches in diameter	per foot	$0.08	½-inches in diameter	per foot	$0.38
3/16-inches in diameter	" "	.12	⅝-inches in diameter	" "	.48
¼-inches in diameter	" "	.17	¾-inches in diameter	" "	.60
5/16-inches in diameter	" "	.22	⅞-inches in diameter	" "	.80
⅜-inches in diameter	" "	.27	1-inches in diameter	" "	.96

Horse-Power of Leather Belting

SINGLE

1-INCH WIDE, 800 FEET PER MINUTE=1 HORSE-POWER

Belt Speed, Feet Per Minute	WIDTH OF BELT IN INCHES											
	2	3	4	5	6	8	10	12	14	16	18	20
400	1	1½	2	2½	3	4	5	6	7	8	9	10
600	1½	2¼	3	3¾	4½	6	7½	9	10½	12	13½	15
800	2	3	4	5	6	8	10	12	14	16	18	20
1000	2½	3¾	5	6¼	7½	10	12½	15	17½	20	22½	25
1200	3	4½	6	7½	9	12	15	18	21	24	27	30
1500	3¾	5¾	7½	9½	11¼	15	18¾	22½	26¼	30	33¾	37½
1800	4½	6¾	9	11¼	13½	18	22½	27	31½	36	40½	45
2000	5	7½	10	12½	15	20	25	30	35	40	45	50
2400	6	9	12	15	18	24	30	36	42	48	54	60
2800	7	10½	14	17½	21	28	35	42	49	56	63	70
3000	7½	11¼	15	18¾	22½	30	37½	45	52½	60	67½	75
3500	8¾	13	17½	22	26	35	44	52½	61	70	79	88
4000	10	15	20	25	30	40	50	60	70	80	90	100
4500	11¼	17	22½	28	34	45	57	69	78	90	102	114
5000	12½	19	25	31	37½	50	62½	75	87½	100	112	125

DOUBLE

1-INCH WIDE, 550 FEET PER MINUTE=1 HORSE-POWER

Belt Speed, Feet Per Minute	WIDTH OF BELT IN INCHES												
	4	6	8	10	12	14	16	18	20	22	24	28	30
400	2¾	4¼	5¾	7¼	8½	10	11½	13	14½	16	17½	20	21½
600	4¼	6½	8¾	11	13	15	17½	19½	22	24	26	30½	32½
800	5¾	8½	11½	14½	17½	20½	23	26	29	32	34½	40½	43½
1000	7¼	11	14½	18¼	21½	25½	29	32½	36	40	43½	51	54½
1200	8½	13	17½	22	26	30½	34½	39	44	48	52½	60½	65
1500	10¾	16¼	21¾	27¼	32½	38	43½	49	54½	60	65½	76½	81½
1800	13	19½	26	32¾	39	45½	52	59	65½	72	78½	91½	98
2000	14½	21¾	29	36½	43½	50½	58	65½	72½	80	87	102	109
2400	17¼	26	34¾	44	52½	60½	69½	78½	88	96	105	122	131
2800	20¼	30½	40½	51	61	71	81	91½	102	112	122	142	153
3000	21½	32½	43½	54½	65½	76	87½	98	108	120	131	153	163
3500	25½	38	50¾	63½	76	89	102	114	127	140	153	178	191
4000	29	43½	58¼	72¾	87	101	116	131	145	160	174	204	218
4500	32½	49	65	82	98	114	131	147	163	180	196	229	245
5000	36½	54½	72¾	91	109	127	145	163	182	200	218	254	272

Rawhide and Tanned Lace Leather

Fig. 1007

In Sides or One-Half Sides
Per Square Foot
Market
Price

Cut Lacing

Fig. 1008

BOTH RAWHIDE AND TANNED

Width, Inches	Price, Per 100 Feet	Width, Inches	Price, Per 100 Feet	Width, Inches	Price, Per 100 Feet
$\frac{1}{4}$	$1.25	$\frac{7}{16}$	$2.00	$\frac{3}{4}$	$3.75
$\frac{5}{16}$	1.50	$\frac{1}{2}$	2.25	$\frac{7}{8}$	4.50
$\frac{3}{8}$	1.75	$\frac{5}{8}$	3.00	1	5.00

Composition Wire Belt Lace

This Lace is adapted for either leather or rubber belts. Each size is packed in a box containing 50 feet.

Number	Description	Price per 100 Feet
0	For belts from 1-inch to 2½-inches.............	$2.00
1	For single belts 5-inches and under...........	2.00
2	For all single belts wider than 5-inches; also for all double belts under 8-inches.............	2.00
3	For all double belts wider than 8-inches........	2.00

Fig. 1009

Empire Lace Cutters

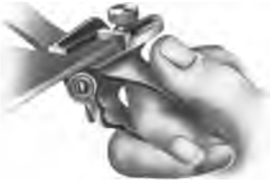


Fig. 1010

Per dozen........................$6.00

Revolving Spring Belt Punches

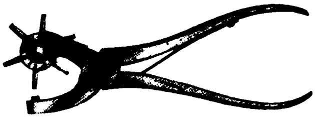


Fig. 1011

Four Tube Punches..	Per dozen	$ 8.75
Six Tube Punches..	Per dozen	11.25
Extra Tubes.........	Per dozen	1.15

Belt Punches

Made of solid steel, drop forged, oil tempered and oil finished.

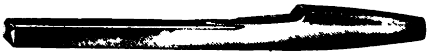


Fig. 1012

Number	6	8	10	12	14	15	16
Diameter of hole ......inches	11/64	7/32	9/32	11/32	13/32	15/32	1/2
Length ....inches	4	4 1/8	4 3/8	4 1/2	4 3/4	5	5
Price ....per dozen	$1.80	1.80	2.60	2.60	4.25	4.60	4.60

Bemis and Call Drive Punches—No. 19

Made of special grade tool steel. Highly polished.

Number	1	8	10	12	14	15	16
Diameter of hole....inches	8/100	21/100	28/100	35/100	45/100	50/100	55/100
Price ....per dozen	$5.25	5.75	5.75	7.50	9.00	11.00	11.00

Manhattan Steel Belt Fasteners

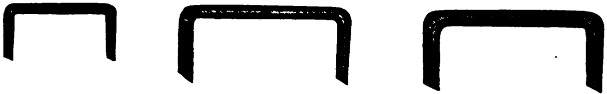


Fig. 1013

PACKED 200 IN A BOX

Particular attention has been given in the manufacture of these Fasteners to produce a quality superior to all other staple shaped drive belt hooks on the market. They are manufactured of special steel wire made expressly for this purpose. The points are carefully made to drive easily and clinch firmly without breaking.

They will not spread or bend when driven.

No. 0 —For Light or Single Belts
No. 1 —For All Belts Less than 4-Ply
No. 1½—For Double Leather Belts
No. 2—For Belts from 4 to 6-Ply
No. 3—For Belts from 6 to 10-Ply

Any size...........................Per thousand $1.50

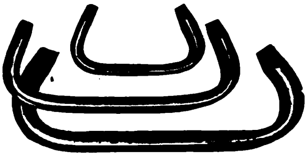


Fig. 1014

Improved Pointed Belt Hooks

These Belt Hooks are made of the best quality of Norway iron, with smooth beveled points.

They clamp the fibre of the belt securely and will not pull out or get loose. They will not jump or slip in passing over the pulley.

Number	15	14	13	12	11	10	9	8	7	6
Price ....per 1000	$ 2.00	2.40	2.60	2.80	3.00	3.50	4.00	5.00	6.00	8.50
Number	5	4	3	2	1	Size ......inches			2½	3
Price ....per 1000	$11.00	14.00	16.00	20.00	30.00	Price....per 1000			$50.00	60.00

Stag Steel Belt Hooks

THE ZIG-ZAG HOOK WITH THE SOLID BACK

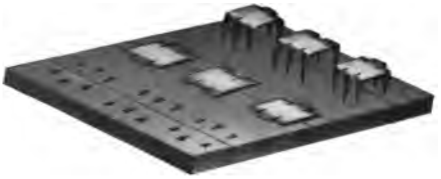


Fig. 1015

Number	Thickness and Kind of Belt	Price, Per 100 Pieces	Number	Thickness and Kind of Belt	Price, Per 100 Pieces
00	For light leather, rubber or cotton belts, 1/16 to 5/32-inch thick, 3/8 to 3-inches wide. Packed 200 in a box	$0.80	2	For heavy single or light double leather, 4-ply rubber or cotton belts, 1 to 8-inches wide. Packed 100 in a box..................	$2.00
0	For light leather, rubber or cotton belts, 1/8 to 3/16-inch thick, 1/2 to 3-inches wide. Packed 200 in a box	1.00	3	For double leather, 4 to 6-ply rubber or cotton belts, 1 to 12-inches wide. Packed 100 in a box	3.40
1	For single leather, 3-ply rubber or cotton belts, 1 to 5-inches wide. Packed 100 in a box..........	1.20			

Alligator Steel Belt Lacing

Adapted for use on Leather, Rubber, Canvas or Cotton Belts

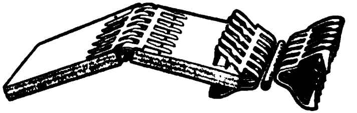


Fig. 1016

Box Number	Lacing Number	Length of Section, Inches	Width Contents Will Lace, Inches	Price, Per Box	Thickness and Kind of Belt
F	25	8	48	$1.00	For single leather, 3-ply rubber, 4-ply cotton and for belts 3/16 to 7/32-inch thick.
G	25	12	96	2.00	
M	35	8	32	1.00	For light double leather, 5-ply rubber, 5 to 6-ply cotton and for belts 9/32 to 5/16-inch thick.
N	35	12	48	1.50	
U	45	12	48	2.00	For heavy double leather, 6-ply rubber, 6 to 8-ply cotton and for belts 11/32 to 3/8-inch thick.
X	65	12	48	2.60	For extra heavy and wide double leather, 7 and 8-ply rubber, 8 to 10-ply cotton and for belts 7/16 to 1/2-inch thick.

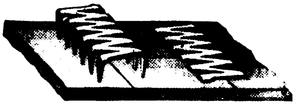
Lacing Nos. 25, 35, and 45 furnished with Gauge Pin and either Rawhide or Rocker Hinge Pins.
Lacing No. 65 furnished with Gauge Pin and Rocker Hinge Pins.

EXTRA HINGE PINS

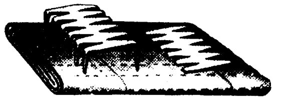
For Lacing Number		25	25	35	35	45	65
Diameter	inches	1/8	1/8	5/32	5/32	3/16	1/4
Length	inches	8	12	8	12	12	12
Twisted Rawhide Pins	per dozen	$0.30	.45	.35	.50	.60	.....
Sectional Steel Rocker Pins	per dozen	.....	$0.45	.....	.50	.60	.70

Bristol's Patent Steel Belt Lacing

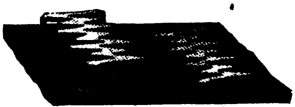
ASSORTED WIDTHS



For Leather Belts
Fig. 1017



For Woven Belts
Fig. 1018



For All Kinds of Belts
Fig. 1019

PACKED 100 INCHES IN A BOX

Number	Thickness and Kind of Belt	Price, Per Box
	STYLE No. 1—FOR LEATHER BELTS	
00	For split leather and extra light belts from 1/16 to 1/8-inch thick	$1.00
0	For split leather and light belts from 1/8 to 3/16-inch thick	1.00
1	For ordinary single leather belts from 3/16 to 1/4-inch thick	1.50
2	For extra heavy and wide single leather belts from 1/4 to 5/16-inch thick	2.00
3	For double leather belts from 5/16 to 3/8-inch thick	2.50
4	For heavy double leather belts from 3/8 to 7/16-inch thick	3.00
5	For extra heavy double leather belts from 7/16 to 9/16-inch thick	3.50
	STYLE No. 11—FOR WOVEN BELTS	
10	For 2-ply rubber and cotton belts from 1/8 to 3/16-inch thick	$1.00
11	For 3-ply rubber and cotton belts from 3/16 to 1/4-inch thick	1.50
12	For 4-ply rubber and cotton belts from 1/4 to 5/16-inch thick	2.00
13	For 5-ply rubber and cotton belts from 5/16 to 3/8-inch thick	2.50
14	For 6-ply rubber and cotton belts from 3/8 to 7/16-inch thick	3.00
15	For 7-ply rubber and cotton belts from 7/16 to 9/16-inch thick	3.50
17	For 8-ply and extra double heavy rubber and cotton belts from 1/2 to 5/8-inch thick	4.95
	STAGGERED POINT STYLE—FOR ALL KINDS OF BELTS	
110	For all kinds of belts from 1/8 to 5/32-inch thick. Split leather and light rubber and cotton belts	$1.00
111	For all kinds of belts from 3/16 to 1/4-inch thick. Ordinary single leather belts and 3-ply rubber and cotton belts	1.50
112	For all kinds of belts from 1/4 to 5/16-inch thick. Extra heavy and wide single leather belts and 4-ply rubber and cotton belts	2.00
113	For all kinds of belts from 5/16 to 3/8-inch thick. Double leather belts and 5-ply rubber and cotton belts	2.50
114	For all kinds of belts from 3/8 to 7/16-inch thick. Heavy double leather belts and 6-ply rubber and cotton belts	3.00
115	For all kinds of belts from 7/16 to 9/16-inch thick. Extra heavy double leather belts and 7-ply rubber and cotton belts	3.50

Belt Clamps

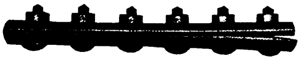


Fig. 1020

An efficient and serviceable belt clamp. Used throughout the oil regions.

8-inch........Each $0.35 10-inch........Each $0.40 12-inch.......Each $0.50

Moran's Steel Belt Couplings

For round belts of every description.

Size ....inches	1/4	5/16	3/8	7/16	1/2
Price ....per dozen	$2.00	2.50	3.00	3.50	4.00
Size ....inches	9/16	5/8	11/16	3/4	7/8
Price ....per dozen	$5.00	6.00	7.50	9.00	13.00

Sizes are outside diameters.

Fig. 1021

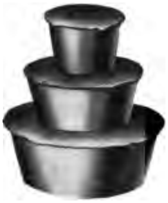


Fig. 1022

"Royal Worcester" Belt Cement

This cement is the same as used in the manufacture of our leather belting. Being put up in cakes, it is solid cement, and when dissolved and ready for use will make in bulk 2½ times as much as the cements commonly put up and sold in tin cans.

In 1, 2 and 5 Pound Cakes.............Per pound $0.75

"Neptune" Belt Cement

A high grade belt cement for use in waterproof leather belting. Put up in air tight tin cans.

In 1 Pound Tin Cans.........Per pound $1.50

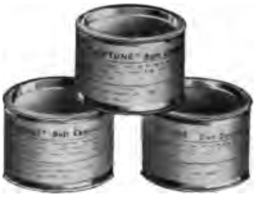


Fig. 1023

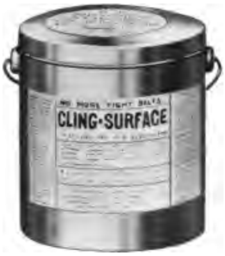


Fig. 1024

"Cling-Surface" Belt Dressing

A preservative and filler for leather, rubber or canvas belts, and ropes, which will make and keep them pliable, clean, and water proof. It prevents drying out or cracking and at the same time stops slippage so that all belts and ropes can be run easy or slack and transmit full loads. Contains no resins or other harmful ingredients.

In 10 Pound Tin Pails...........Per pound $0.35

"Parvalue" Belt Dressing

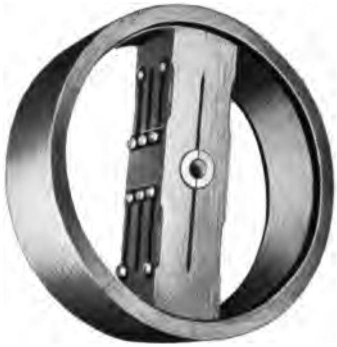
Fig. 1025

A modern stick belt dressing for leather, rubber or canvas belts that not only prevents slipping, but keeps them soft and pliable. It is a wax-like composition not effected by the weather and does not deteriorate.

In 1 Pound Sticks...................Per dozen $6.00

Wood Split Pulleys

WITH INTERCHANGEABLE BUSHING SYSTEM



SINGLE ARM CONSTRUCTION—SIZES 11 TO 36-INCHES IN DIAMETER
Fig. 1026

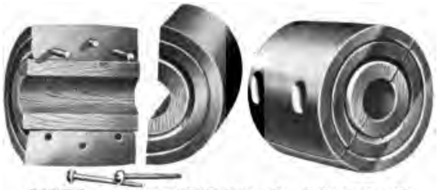
Double arm construction used on sizes 37 to 83-inches in diameter.

The strongest wood pulley made. Nailed and glued. The arms are built of white oak. The spokes are tenoned into the rim and firmly secured. In clamping the pulley upon the shaft, heavier iron plates together with hexagon nuts and bolts of larger size and in greater number, are used, than with any other make.

Finished throughout with pure orange shellac, unquestionably the best material known for the purpose.

Every pulley guaranteed to run true and in perfect balance.

Small Hardwood Split Pulleys

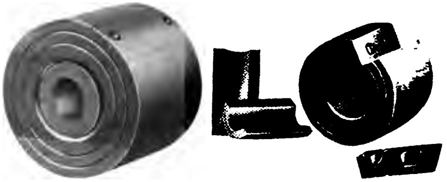


SIZES 3 TO 5-INCHES IN DIAMETER
Fig. 1027

These pulleys are made of maple, thoroughly seasoned, and coated with pure orange shellac, making them waterproof.

Pulleys 3 to 5-inches in diameter are clamped to the shaft by heavy slotted head compression bolts, accessible directly from the face of the pulley.

Pulleys 6 to 10-inches in diameter are clamped to the shaft by compression bolts of varying size and number suitable to the diameter and face of the pulley in which they are used. These bolts are covered by a removable cap, which is held in place by small slotted head bolts.



SIZES 6 TO 10-INCHES IN DIAMETER
Fig. 1028

BORE OF STANDARD PULLEYS

Pulleys—3-inches in diameter are bored	1 11/16-inches
Pulleys—4 to 7-inches in diameter, inclusive, are bored	2½-inches
Pulleys—8 to 72-inches in diameter, inclusive, are bored	3½-inches

By the use of interchangeable bushings each size pulley can be bushed to fit any shaft less in diameter than the bore.

One complete bushing of length required by pulley hub is furnished with each pulley without charge.

For boring pulleys larger than standard, an additional charge will be made.

When ordering pulleys state, first, diameter; second, width of face; third, size of shaft, and fourth, whether Crown or Straight Face. All pulleys sent with Crown Face, unless otherwise ordered.

Wood Split Pulleys

STANDARD PRICE LIST—EFFECTIVE DECEMBER 1st, 1908
PRICE—EACH

Diameter, Inches	Width of Face—Inches												
	3	4	5	6	8	10	12	14	16	18	20	22	24
4	$2.80	$2.90	$3.10	$3.30	$ 3.70	$ 4.10	$ 4.50	......	......	......	......	......	......
5	2.85	2.95	3.20	3.40	3.85	4.30	4.75	......	......	......	......	......	......
6	2.90	3.00	3.25	3.50	4.00	4.50	5.00	......	......	......	......	......	......
7	2.95	3.05	3.35	3.60	4.15	4.70	5.25	$ 5.80	......	......	......	......	......
8	3.00	3.10	3.40	3.70	4.30	4.90	5.50	6.10	......	......	......	......	......
9	3.10	3.25	3.60	3.90	4.55	5.20	5.85	6.50	......	......	......	......	......
10	3.25	3.40	3.75	4.10	4.80	5.50	6.20	6.90	$ 7.60	......	......	......	......
11	3.50	3.70	4.10	4.50	5.30	6.10	6.90	7.70	8.50	......	......	......	......
12	3.75	4.00	4.45	4.90	5.80	6.70	7.60	8.50	9.40	$10.30	......	......	......
13	.....	4.30	4.80	5.30	6.30	7.30	8.30	9.30	10.30	11.30	......	......	......
14	.....	4.60	5.15	5.70	6.80	7.90	9.00	10.10	11.20	12.30	$13.40	......	......
15	.....	4.90	5.50	6.10	7.30	8.50	9.70	10.90	12.10	13.30	14.50	......	......
16	.....	5.20	5.85	6.50	7.80	9.10	10.40	11.70	13.00	14.30	15.60	$16.90	......
17	.....	5.50	6.20	6.90	8.30	9.70	11.10	12.50	13.90	15.30	16.70	18.10	......
18	.....	5.80	6.55	7.30	8.80	10.30	11.80	13.30	14.80	16.30	17.80	19.30	$20.80
19	.....	6.10	6.90	7.70	9.30	10.90	12.50	14.10	15.70	17.30	18.90	20.50	22.10
20	.....	6.40	7.25	8.10	9.80	11.50	13.20	14.90	16.60	18.30	20.00	21.70	23.40
22	.....	7.00	7.95	8.90	10.80	12.70	14.60	16.50	18.40	20.30	22.20	24.10	26.00
24	.....	7.70	8.80	9.90	12.10	14.30	16.50	18.70	20.90	23.10	25.30	27.50	29.70
26	.....	8.40	9.65	10.90	13.40	15.90	18.40	20.90	23.40	25.90	28.40	30.90	33.40
28	.....	9.10	10.50	11.90	14.70	17.50	20.30	23.10	25.90	28.70	31.50	34.30	37.10
30	.....	9.80	11.35	12.90	16.00	19.10	22.20	25.30	28.40	31.50	34.60	37.70	40.80
32	.....	10.50	12.20	13.90	17.30	20.70	24.10	27.50	30.90	34.30	37.70	41.10	44.50
34	.....	11.30	13.15	15.00	18.70	22.40	26.10	29.80	33.50	37.20	40.90	44.60	48.30
36	.....	12.10	14.10	16.10	20.10	24.10	28.10	32.10	36.10	40.10	44.10	48.10	52.10
38	.....	.....	.....	17.20	21.50	25.80	30.10	34.40	38.70	43.00	47.30	51.60	55.90
40	.....	.....	.....	18.30	22.90	27.50	32.10	36.70	41.30	45.90	50.50	55.10	59.70
42	.....	.....	.....	19.60	24.60	29.60	34.60	39.60	44.60	49.60	54.60	59.60	64.60
44	.....	.....	.....	20.90	26.30	31.70	37.10	42.50	47.90	53.30	58.70	64.10	69.50
46	.....	.....	.....	22.30	28.10	33.90	39.70	45.50	51.30	57.10	62.90	68.70	74.50
48	.....	.....	.....	23.80	30.00	36.20	42.40	48.60	54.80	61.00	67.20	73.40	79.60
50	.....	.....	.....	25.40	32.00	38.60	45.20	51.80	58.40	65.00	71.60	78.20	84.80
52	.....	.....	.....	27.10	34.10	41.10	48.10	55.10	62.10	69.10	76.10	83.10	90.10
54	.....	.....	.....	28.90	36.30	43.70	51.10	58.50	65.90	73.30	80.70	88.10	95.50
56	.....	.....	.....	30.80	38.60	46.40	54.20	62.00	69.80	77.60	85.40	93.20	101.00
58	.....	.....	.....	32.80	41.00	49.20	57.40	65.60	73.80	82.00	90.20	98.40	106.60
60	.....	.....	.....	34.90	43.50	52.10	60.70	69.30	77.90	86.50	95.10	103.70	112.30
62	.....	.....	.....	37.10	46.10	55.10	64.10	73.10	82.10	91.10	100.10	109.10	118.10
64	.....	.....	.....	39.40	48.80	58.20	67.60	77.00	86.40	95.80	105.20	114.60	124.00
66	.....	.....	.....	41.90	51.80	61.70	71.60	81.50	91.40	101.30	111.20	121.10	131.00
68	.....	.....	.....	44.50	54.90	65.30	75.70	86.10	96.50	106.90	117.30	127.70	138.10
70	.....	.....	.....	47.20	58.10	69.00	79.90	90.80	101.70	112.60	123.50	134.40	145.30
72	.....	.....	.....	50.00	61.40	72.80	84.20	95.60	107.00	118.40	129.80	141.20	152.60
78	.....	.....	.....	.....	71.90	84.80	97.70	110.60	123.50	136.40	149.30	162.20	175.10
84	.....	.....	.....	.....	83.30	97.70	112.10	126.50	140.90	155.30	169.70	184.10	198.50
90	.....	.....	.....	.....	95.60	111.50	127.40	143.30	159.20	175.10	191.00	206.90	222.80
96	.....	.....	.....	.....	109.00	126.50	144.00	161.50	179.00	196.50	214.00	231.50	249.00
102	.....	.....	.....	.....	123.70	143.00	162.30	181.60	200.90	220.20	239.50	258.80	278.10
108	.....	.....	.....	.....	139.30	160.40	181.50	202.60	223.70	244.80	265.90	287.00	308.10
114	.....	.....	.....	.....	155.80	178.70	201.60	224.50	247.40	270.30	293.20	316.10	339.00
120	.....	.....	.....	.....	173.20	197.90	222.60	247.30	272.00	296.70	321.40	346.10	370.80

APPROXIMATE SHIPPING WEIGHTS OF WOOD SPLIT PULLEYS

Size, Inches	Weight, Pounds	Size, Inches	Weight, Pounds	Size, Inches	Weight, Pounds	Size, Inches	Weight, Pounds	Size, Inches	Weight, Pounds	Size, Inches	Weight, Pounds
6x 3	2	14x 3	7	18x12	35	24x12	52	36x 4	30	46x 8	101
4	3	4	8	14	40	14	60	6	46	10	125
6	4	5	11	20x 3	11	26x 4	18	8	62	12	144
8	5	6	13	4	13	6	28	10	79	48x 6	78
8x 3	3	8	18	5	17	8	38	12	89	8	104
4	4½	10	22	6	20	10	52	14	104	10	132
6	6½	12	26	8	27	12	56	16	115	12	148
8	9	16x 3	8	10	34	28x 4	20	40x 4	47	50x 8	108
10	10½	4	10	12	39	6	30	6	65	10	144
10x 3	5	5	12	14	49	8	41	8	86	12	161
4	7½	6	15	22x 4	14	10	53	10	109	52x 8	113
6	11	8	21	5	19	12	61	12	125	10	148
8	14	10	25	6	22	30x 4	25	42x 6	68	12	170
10	17	12	30	8	29	6	38	8	90	54x 8	119
12	20	14	35	10	35	8	51	10	118	10	153
12x 3	6	18x 3	10	12	41	10	65	12	128	12	176
4	7	4	12	14	50	12	72	44x 6	71	60x 8	142
5	8	5	15	24x 4	17	32x 4	26	8	94	10	187
6	10	6	18	5	22	6	40	10	122	12	210
8	13	8	24	6	26	8	55	12	135	72x 8	221
10	16	10	30	8	36	10	73	46x 6	76	10	263
12	19			10	46	12	82			12	306

Philips' Pressed Steel Pulleys

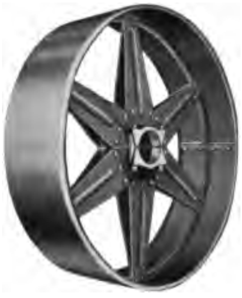


Fig. 1029

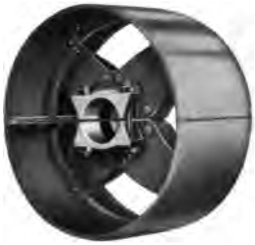


Fig. 1030

Philips' Split Pressed Steel Pulleys weigh from one-half to three-quarters less than cast iron pulleys of corresponding sizes.

The steel spokes do not fan the air like a wood pulley.

Fitted with a complete system of interchangeable iron bushings for all sizes of shafting.

These pulleys are constructed entirely of steel made especially for this particular purpose.

PRICE—EACH

Diameter, Inches	Width of Face—Inches						
	3	4	5	6	8	10	12
12	$4.20	$4.63	$4.80	$5.33	$5.78	$6.45	$7.65
13	4.35	4.80	5.20	5.62	6.43	7.20	8.40
14	4.50	5.20	5.65	6.15	7.05	8.03	9.00
15	4.65	5.45	5.80	6.55	7.65	8.80	9.75
16	4.95	5.75	6.10	6.90	8.25	9.45	10.50
17	5.25	6.00	6.50	7.28	8.78	10.05	11.25
18	5.55	6.38	7.00	7.65	9.30	10.65	12.00
20	6.00	7.50	8.10	9.00	10.73	12.00	14.25
22	6.50	8.55	9.50	10.28	12.00	14.10	16.80
24	7.50	8.90	10.00	10.95	13.20	15.68	19.05
26	8.50	9.55	10.75	11.95	14.40	17.10	21.30
28	9.50	10.80	11.85	12.90	15.45	18.15	22.90
30	10.75	12.00	13.00	14.10	17.25	19.90	24.75
32	12.00	13.20	14.35	15.45	19.35	22.50	26.86
34	13.00	14.40	15.85	17.25	21.75	25.50	30.00
36	14.00	15.90	17.75	19.50	24.00	28.65	33.75

Cast Iron Pulleys

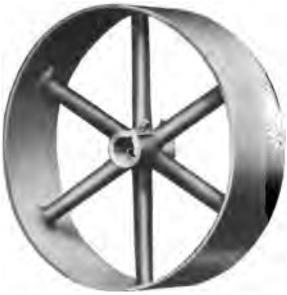


Fig. 1031

Cast Iron Pulleys are turned, bored in the lathe, balanced, painted and provided with set screws or key seats, as may be desired.

For non-shifting belts, pulleys should have crown faces. For shifting belts the driving pulleys should have straight faces. Tight and loose pulleys should have crown faces.

When ordering pulleys state, first, diameter; second, width of face; third, size of shaft, and fourth, whether Crown or Straight Face. All pulleys sent with Crown Face, unless otherwise ordered.

Prices upon application.

Nicholson Patent Compression Shaft Couplings

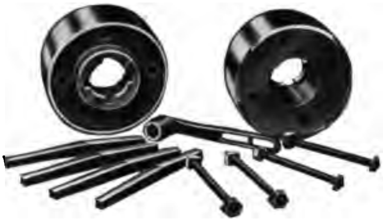


Fig. 1032

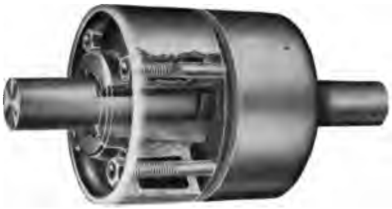


Fig. 1033

The "Nicholson" is the only compression coupling known that will withstand a strain on a 5-inch shaft, that is sufficient to twist off the shaft itself, as the "Nicholson" has been known to do, and in many cases on shafts less than 5-inches. It possesses a powerful grip, similar to that of a lathe chuck, obtained by drawing together the tapering bore castings over double tapering steel jaws, secured by an ample number of through bolts.

Size of Shaft, Inches	Price, Each	Length Over All, Inches	Diameter Coupling, Inches	Number Jaws	Number Bolts
$1\frac{3}{16}$	$ 4.75	$5\frac{1}{4}$	$5\frac{1}{4}$	3	3
$1\frac{5}{16}$	5.00	$5\frac{3}{4}$	$5\frac{3}{4}$	3	3
$1\frac{7}{16}$	5.50	$6\frac{1}{4}$	$6\frac{5}{16}$	3	3
$1\frac{11}{16}$	6.25	$6\frac{3}{4}$	$6\frac{7}{8}$	4	3
$1\frac{15}{16}$	8.00	8	$7\frac{3}{8}$	4	4
$2\frac{3}{16}$	9.00	$8\frac{1}{2}$	$8\frac{1}{8}$	4	4
$2\frac{7}{16}$	10.75	$9\frac{3}{4}$	$8\frac{7}{16}$	4	4
$2\frac{11}{16}$	13.00	$10\frac{1}{4}$	$9\frac{5}{16}$	4	4
$2\frac{15}{16}$	16.00	$11\frac{1}{4}$	$9\frac{7}{8}$	4	4
$3\frac{3}{16}$	19.00	$12\frac{1}{4}$	$11\frac{1}{8}$	4	4
$3\frac{7}{16}$	23.00	$13\frac{1}{4}$	$11\frac{1}{2}$	4	4
$3\frac{15}{16}$	30.00	$14\frac{1}{4}$	$12\frac{3}{4}$	4	4
$4\frac{7}{16}$	42.00	$16\frac{1}{4}$	$13\frac{5}{8}$	6	6
$4\frac{15}{16}$	55.00	$17\frac{3}{4}$	$14\frac{7}{8}$	6	6
$5\frac{7}{16}$	65.00	$19\frac{1}{4}$	$16\frac{1}{4}$	6	6
$5\frac{15}{16}$	76.00	$21\frac{1}{4}$	$16\frac{3}{4}$	6	6
$6\frac{7}{16}$	115.00	$22\frac{1}{4}$	$17\frac{1}{8}$	6	12
$6\frac{15}{16}$	125.00	$22\frac{1}{4}$	$17\frac{5}{8}$	6	12

Prices of intermediate sizes same as next larger coupling listed. For reducing couplings, take price of coupling for the larger of the two shafts and add 20 per cent.

The reduction is made by making a step in the jaws, to correspond with the difference between the shafts.

Coupling Wrenches

Fig. 1034

Number	Length, Inches	Size Nut, Inches	For Size Coupling, Inches	Price, Each
0	6	$\frac{7}{16}$	$1\frac{3}{16}$	$0.10
1	$8\frac{1}{4}$	$\frac{1}{2}$	$1\frac{5}{16}$ to $1\frac{15}{16}$	.15
2	$10\frac{1}{4}$	$\frac{5}{8}$	$2\frac{3}{16}$ to $2\frac{15}{16}$	.20
3	$12\frac{1}{4}$	$\frac{3}{4}$	$3\frac{3}{16}$ to $3\frac{7}{16}$	.30
4	14	$\frac{7}{8}$	$3\frac{15}{16}$ to $4\frac{15}{16}$	.40
5	16	1	$5\frac{7}{16}$ to $6\frac{15}{16}$	.60

Levalley Steel Cinch Couplings

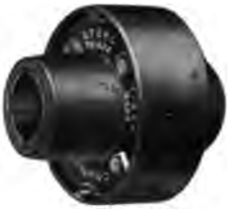


Fig. 1035

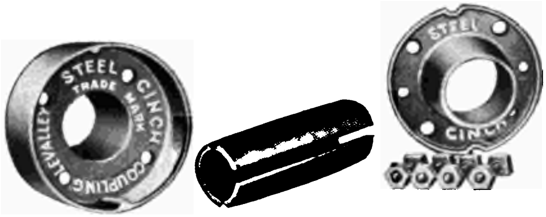


Fig. 1036

A flanged compression coupling made of special steel, strong, very light in weight, durable and thoroughly efficient. The grip on the shaft is perfect when coupling is properly put on and drawn thoroughly tight, and is far beyond the limit of power designated for the respective sizes of shafts. The tapering sleeve is slotted its full length for standard keys, thus permitting the ready use of a key if thought advisable in the larger sizes.

Size of Shaft, Inches	Standard Coupling, Each	Reducing Coupling, Each	Bushing, Each	Sleeve, Each	Length Over All, Inches	Diameter Coupling, Inches
1 3/16	$4.75	$5.45	$0.70	$1.40	4 3/4	5 3/8
1 7/16	5.50	6.35	.85	1.65	5 1/4	5 1/2
1 11/16	6.25	7.20	.95	1.90	6	6
1 15/16	8.00	9.20	1.20	2.40	6 3/4	6 5/8
2 3/16	9.00	10.35	1.35	2.70	7 1/2	7 1/4
2 7/16	10.75	12.35	1.60	3.20	8	7 3/4
2 11/16	13.00	14.95	1.95	3.90	8 3/4	8
2 15/16	16.00	18.40	2.40	4.80	9 1/2	8 1/2
3 3/16	19.00	21.85	2.85	5.70	10 1/4	9
3 7/16	23.00	26.45	3.45	6.90	11	9 1/2

The price of Reducing Couplings is determined by the largest size.

DIRECTIONS TO PUT ON LEVALLEY STEEL CINCH COUPLINGS

HIGHLY IMPORTANT

To couple securely, the shafts should be straight and of uniform size, and in good line. Clean the sleeve and inside holes of the coupling. For a cleaner, use kerosene oil and clean till dry, or a little vinegar or mild acid, or a weak solution of blue vitriol, applied to clean the ends of the shafts and inside of the sleeve is good, and forms an excellent bond. Make the parts clean. Carefully insert the ends of the shafts to the middle of the sleeve. Lightly oil the outside of the sleeve with clean thin-bodied oil, but do not permit oil to get in the keyway, nor into the inside of the sleeve. Pass the outer parts over the sleeve—put in the bolts, turning the nuts, each a little, till they are all fairly evenly tight. Set the outer parts of the coupling home on the sleeve by a few blows with a hammer and soft metal set on the hubs of the coupling. Draw the nuts evenly and strong and again use the soft metal set and hammer, and draw the nuts hard tight. Repeat this operation till the bolts are drawn firmly home and the coupling is solidly on. It must be given a hard solid vise grip. If a stronger hold than this is needed, a suitable key can be used for which a keyway is provided in the sleeve; but even without a key, it will transmit more than twice the horse power given in the standard accepted lists for the respective sizes of shafts if put on properly, hard and solid. Do it right and there will be no slip. A short time thus employed will be of great value.

Compression Couplings

FITTED WITH BOLTS AND DOWEL PINS

A convenient and durable shaft coupling for medium service that may be removed or replaced without disturbing the line shaft. Clamps the shaft with all the direct force of the bolts and holds with a parallel and positive grip.

Size of Shaft, Inches	Price, Each	Size of Shaft, Inches	Price, Each
1 3/16	$ 5.00	2 11/16	$12.50
1 7/16	6.00	2 15/16	14.00
1 11/16	7.00	3 3/16	16.00
1 15/16	8.50	3 7/16	20.00
2 3/16	10.00	3 11/16	24.00
2 7/16	11.00	3 15/16	28.00

The price of Reducing Couplings is determined by the largest size.

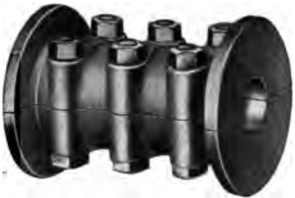


Fig. 1037

Flange Couplings

FITTED WITH BOLTS AND KEYS

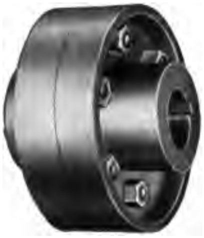


Fig. 1038

These Couplings are finished all over, key-seated and furnished with keys. Adapted for ordinary service. Easily put on.

Size of Shaft, Inches	Price, Each	Size of Shaft, Inches	Price, Each
1 3/16	$ 7.50	2 11/16	$18.80
1 7/16	8.70	2 15/16	21.75
1 11/16	10.20	3 3/16	25.10
1 15/16	11.85	3 7/16	28.80
2 3/16	13.90	3 11/16	33.00
2 7/16	16.20	3 15/16	37.60

The price of Reducing Couplings is determined by the largest size.

Safety Set Collars

SOLID

Furnished with countersunk set screws in compliance with legal requirements.

Size of Shaft, Inches	Price, Each	Size of Shaft, Inches	Price, Each	Size of Shaft, Inches	Price, Each
1/2	$0.65	1 3/16	$0.80	2 7/16	$1.80
3/4	.65	1 5/16	.90	2 11/16	2.10
7/8	.65	1 7/16	1.00	2 15/16	2.40
15/16	.65	1 11/16	1.20	3 7/16	3.00
1	.65	1 15/16	1.40	3 11/16	3.30
1 1/8	.75	2 3/16	1.60	3 15/16	3.60

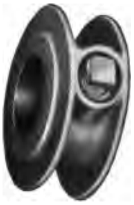


Fig. 1039

Safety Set Collars

SPLIT

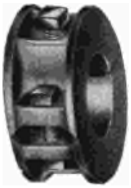


Fig. 1040

Countersunk set screws and bolts protected.

Size of Shaft, Inches	Price, Each	Size of Shaft, Inches	Price, Each	Size of Shaft, Inches	Price, Each
1/2	$0.98	1 3/16	$1.20	2 7/16	$2.70
3/4	.98	1 5/16	1.35	2 11/16	3.15
7/8	.98	1 7/16	1.50	2 15/16	3.60
15/16	.98	1 11/16	1.80	3 7/16	4.50
1	.98	1 15/16	2.10	3 11/16	4.95
1 1/8	1.13	2 3/16	2.40	3 15/16	5.40

For dimensions on articles shown above, see page 383.

Adjustable Ball and Socket Double Braced Drop Hangers

WITH PLAIN OR RING OILING BEARINGS

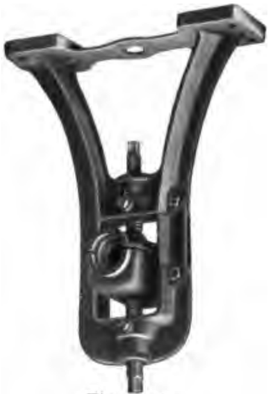


Fig. 1041

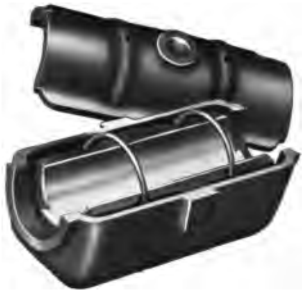


Fig. 1042

Our Adjustable Ball and Socket Double Braced Drop Hangers are designed for supporting heavy head shafts carrying main driving pulleys and to meet general conditions in the transmitting of power.

They are strong, heavy and well proportioned. Neat in design and highly finished. The metal is distributed so as to give the greatest possible strength throughout, and are sure to give satisfaction where a rigid, dependable hanger is wanted.

The frame accommodates our full line of interchangeable bearings, which are placed in position by detaching the double brace links, without disturbing other equipment already in place.

All bearings are babbitted, reamed and faced at both ends.

Plain Oiling Bearings, for general service, are lubricated with oil, or by grease directly applied. These bearings can be tapped for grease cups at a slight additional expense.

Ring Oiling Bearings, illustrated above, are oiled by centrifugal attraction with tempered steel rings encircling the shaft and revolving through the oil reservoir, depositing oil on top of the shaft and distributing it over the entire bearing surface. Wipers are cast on each end of the bearing for scraping off and returning to the reservoir any and all surplus oil to be used over again. The oil does not follow the shaft and drop on the floor. Sufficient oil can be placed in the reservoir to run shafts for a period of many months.

Adjustable Ball and Socket Double Braced Drop Hangers

COMPLETE WITH BEARINGS

PRICE—EACH

Size of Shaft, Inches	Type of Bearing	Drop in Inches							
		8	10	12	14	16	18	20	24
1 3/16	Plain Oiling	$ 3.40	$ 3.55	$ 3.75	$ 3.95	$ 4.15	$ 4.40	$ 4.65	......
	Ring Oiling	5.25	5.40	5.60	5.80	6.00	6.25	6.50	......
1 7/16	Plain Oiling	4.10	4.25	4.40	4.65	4.90	5.15	5.45	......
	Ring Oiling	......	6.35	6.50	6.75	7.00	7.25	7.55	$ 8.30
1 11/16	Plain Oiling	4.80	5.00	5.20	5.45	5.70	6.05	6.40	......
	Ring Oiling	......	7.50	7.70	7.95	8.20	8.55	8.90	9.70
1 15/16	Plain Oiling	......	5.90	6.20	6.50	6.80	7.15	7.55	8.45
	Ring Oiling	......	8.80	9.10	9.40	9.70	10.05	10.45	11.35
2 3/16	Plain Oiling	......	7.05	7.35	7.70	8.10	8.50	8.95	10.05
	Ring Oiling	......	10.40	10.75	11.10	11.50	11.90	12.35	13.45
2 7/16	Plain Oiling	......	8.45	8.80	9.20	9.65	10.15	10.65	11.95
	Ring Oiling	......	......	12.75	13.15	13.60	14.10	14.60	15.90
2 11/16	Plain Oiling	......	9.15	9.50	10.95	11.45	12.00	12.60	14.10
	Ring Oiling	......	......	15.05	15.55	16.05	16.60	17.20	18.70
2 15/16	Plain Oiling	......	......	11.75	13.05	13.65	14.30	15.05	16.65
	Ring Oiling	......	......	......	18.40	19.00	19.65	20.40	22.00
3 3/16	Plain Oiling	......	......	12.80	14.00	16.30	17.00	17.80	19.70
	Ring Oiling	......	......	......	21.80	22.50	23.20	24.00	25.90
3 7/16	Plain Oiling	......	......	......	17.25	19.55	20.35	21.25	23.25
	Ring Oiling	......	......	......	......	26.60	27.40	28.30	30.30
3 11/16	Plain Oiling	......	......	......	21.10	23.35	24.25	25.15	27.40
	Ring Oiling	......	......	......	......	31.50	32.40	33.30	35.55
3 15/16	Plain Oiling	......	......	......	......	28.00	28.95	30.00	32.35
	Ring Oiling	......	......	......	......	37.25	38.20	39.25	41.60
*4 3/16	Plain Oiling	......	......	......	......	33.55	34.60	35.70	38.20
	Ring Oiling	......	......	......	......	43.95	45.00	46.10	48.60
*4 7/16	Plain Oiling	......	......	......	......	40.45	41.50	42.60	45.15
	Ring Oiling	......	......	......	......	51.85	52.90	54.00	56.55
*4 11/16	Plain Oiling	......	......	......	......	48.70	49.70	50.80	53.20
	Ring Oiling	......	......	......	......	60.90	61.90	63.00	65.40
*4 15/16	Plain Oiling	......	......	......	......	57.00	57.90	58.95	61.15
	Ring Oiling	......	......	......	......	69.60	70.50	71.55	73.75

*Not carried as regular stock, but can be furnished on special orders on short notice.
For dimensions, see pages 378 and 379.

Dolly Boxes

PLAIN BORED—NOT BABBITTED

Used as bearings for idlers and slow running shafting carrying light loads.

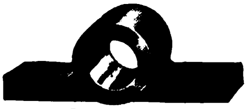


Fig. 1043

Size of Shaft, Inches	Price, Each	Size of Shaft, Inches	Price, Each
$\frac{3}{4}$	$0.80	$1\frac{3}{16}$	$1.35
$\frac{7}{8}$	.90	$1\frac{5}{16}$	1.50
$\frac{15}{16}$	1.00	$1\frac{7}{16}$	1.65
1	1.00	$1\frac{11}{16}$	2.00
$1\frac{1}{8}$	1.35	$1\frac{15}{16}$	2.40

Common Flat Boxes

BABBITTED AND REAMED

Neat in design, strong, and highly finished, and is the type most commonly used.

Size of Shaft, Inches	Price, Each	Size of Shaft, Inches	Price, Each
$\frac{3}{4}$	$2.10	$2\frac{7}{16}$	$5.60
$\frac{15}{16}$	2.10	$2\frac{11}{16}$	6.60
1	2.10	$2\frac{15}{16}$	7.85
$1\frac{3}{16}$	2.40	$3\frac{3}{16}$	9.25
$1\frac{7}{16}$	2.80	$3\frac{7}{16}$	10.80
$1\frac{11}{16}$	3.45	$3\frac{11}{16}$	12.80
$1\frac{15}{16}$	3.95	$3\frac{15}{16}$	14.90
$2\frac{3}{16}$	4.70		

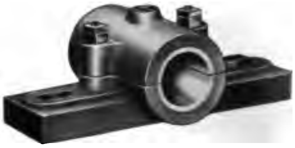


Fig. 1044

Wick Oiling Rigid Pillow Blocks

BABBITTED AND REAMED

Designed for heavy duty with ample weight and strength. Equipped with an oil reservoir in the cap for an absorbent wick which leads the oil down to the shaft.

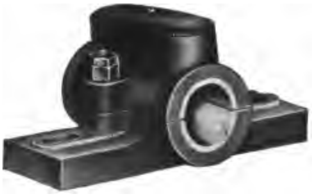


Fig. 1045

Size of Shaft, Inches	Price, Each	Size of Shaft, Inches	Price, Each
1	$2.10	$2\frac{11}{16}$	$6.60
$1\frac{3}{16}$	2.40	$2\frac{15}{16}$	7.85
$1\frac{7}{16}$	2.80	$3\frac{3}{16}$	9.25
$1\frac{11}{16}$	3.45	$3\frac{7}{16}$	10.80
$1\frac{15}{16}$	3.95	$3\frac{11}{16}$	12.80
$2\frac{3}{16}$	4.70	$3\frac{15}{16}$	14.90
$2\frac{7}{16}$	5.60		

Ring Oiling Rigid Pillow Blocks

BABBITTED AND REAMED

This is the ideal bearing for heavy duty and high speed service. The oil reservoir extends the whole length of the bearing, holding a large quantity of oil, sufficient for several months continuous run.

Size of Shaft, Inches	Price, Each	Size of Shaft, Inches	Price, Each
$1\frac{3}{16}$	$4.20	$2\frac{11}{16}$	$11.45
$1\frac{7}{16}$	5.00	$2\frac{15}{16}$	13.60
$1\frac{11}{16}$	5.90	$3\frac{3}{16}$	16.10
$1\frac{15}{16}$	6.90	$3\frac{7}{16}$	19.00
$2\frac{3}{16}$	8.10	$3\frac{11}{16}$	22.65
$2\frac{7}{16}$	9.65	$3\frac{15}{16}$	26.70

For dimensions on articles shown above, see pages 380 and 381.

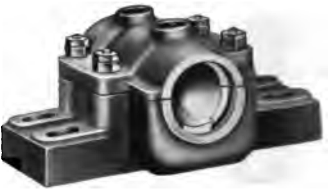


Fig. 1046

Wick Oiling Rigid Post Bearings

BABBITTED AND REAMED

Used in supporting shafting to posts and also where more pulley clearance is desired than can be obtained with a drop hanger.

Size of Shaft, Inches	Price, Each	Size of Shaft, Inches	Price, Each
$\frac{7}{8}$	$2.90	$1\frac{15}{16}$	$5.70
$\frac{15}{16}$	2.90	$2\frac{3}{16}$	6.75
1	2.90	$2\frac{7}{16}$	8.00
$1\frac{3}{16}$	3.45	$2\frac{11}{16}$	9.50
$1\frac{7}{16}$	4.10	$2\frac{15}{16}$	11.20
$1\frac{11}{16}$	4.85		

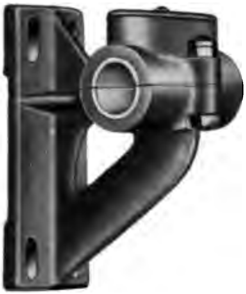


Fig. 1047

Adjustable Ball and Socket Double Braced Post Hangers

WITH PLAIN OR RING OILING BEARINGS

BABBITTED AND REAMED

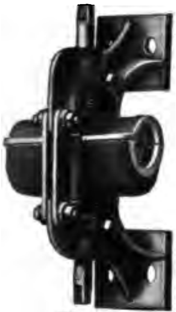


Fig. 1048

Used in supporting heavy line shafting to posts. In supporting shafting in this manner, it is less liable to get out of alignment than if suspended from floor beams.

Size of Shaft, Inches	Plain Oiling, Each	Ring Oiling, Each	Size of Shaft, Inches	Plain Oiling, Each	Ring Oiling, Each
$1\frac{3}{16}$	$3.75	$5.60	$2\frac{11}{16}$	$10.00	$14.60
$1\frac{7}{16}$	4.40	6.50	$2\frac{15}{16}$	11.90	17.25
$1\frac{11}{16}$	5.15	7.65	$3\frac{3}{16}$	14.20	20.40
$1\frac{15}{16}$	6.05	8.95	$3\frac{7}{16}$	16.90	24.00
$2\frac{3}{16}$	7.10	10.50	$3\frac{11}{16}$	20.25	28.40
$2\frac{7}{16}$	8.50	12.40	$3\frac{15}{16}$	24.25	33.50

Vertical Bearings

BABBITTED AND REAMED

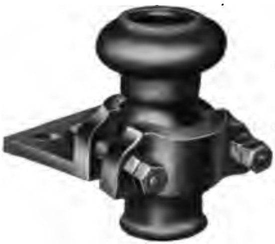


Fig. 1049

An ideal bearing for pump frames. Self aligning. Lubricated with waste saturated with oil or grease placed in the lubricating reservoir.

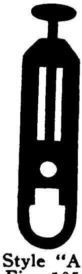
Size of Shaft, Inches	Price, Each	Size of Shaft, Inches	Price, Each
$1\frac{3}{16}$	$2.75	$2\frac{3}{16}$	$6.25
$1\frac{7}{16}$	3.25	$2\frac{7}{16}$	7.50
$1\frac{11}{16}$	3.75	$2\frac{11}{16}$	9.00
$1\frac{15}{16}$	5.00	$2\frac{15}{16}$	11.25

For dimensions on articles shown above, see page 382.

Standard Take-Up Boxes

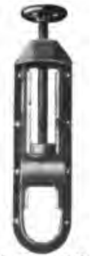
BABBITTED AND REAMED

For use where it is necessary to take up slack in belts, as in elevators or belt conveyors. Made to pull and push.

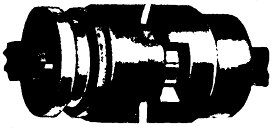

Style "A"
Fig. 1050

Size of Shaft, Inches	Length of Adjustment, Inches	Price Each, "A" or "B"	Size of Shaft, Inches	Length of Adjustment, Inches	Price Each, "A" or "B"
$1\frac{3}{16}$	5	$2.55	$2\frac{7}{16}$	12	$6.75
$1\frac{7}{16}$	7	3.25	$2\frac{7}{16}$	20	9.00
$1\frac{11}{16}$	7	4.00	$2\frac{11}{16}$	20	10.00
$1\frac{15}{16}$	9	4.75	$2\frac{15}{16}$	20	11.00
$2\frac{3}{16}$	9	5.00			
$2\frac{3}{16}$	12	6.00			

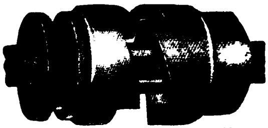
When ordering, state size, length of adjustment, and style wanted.


Style "B"
Fig. 1051

Jaw Clutches and Jaw Clutch Couplings



Square Jaw Clutch Coupling
Fig. 1052



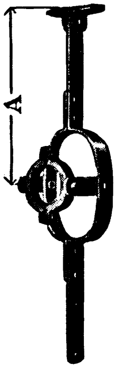
Spiral Jaw Clutch Coupling
Fig. 1053

Size of Shaft, Inches	Jaw Clutch Coupling Only, Without Band or Lever, Each	Sliding Half Jaw Clutch Only, Without Band or Lever, Each	Jaw Clutch Hub Only, Cast On Pulleys or Sprockets, Each
$\frac{15}{16}$	$ 7.60	$ 4.00	$0.80
$1\frac{3}{16}$	8.00	4.25	.95
$1\frac{7}{16}$	9.50	5.00	1.20
$1\frac{11}{16}$	11.00	5.75	1.45
$1\frac{15}{16}$	12.50	6.50	1.90
$2\frac{3}{16}$	13.50	7.00	2.30
$2\frac{7}{16}$	15.00	8.00	2.70
$2\frac{11}{16}$	17.00	9.00	3.00
$2\frac{15}{16}$	21.00	11.00	3.60
$3\frac{3}{16}$	25.00	13.00	4.25
$3\frac{7}{16}$	28.50	15.00	5.00
$3\frac{11}{16}$	36.00	19.00	6.25
$3\frac{15}{16}$	42.00	22.00	7.25

When ordering Spiral Jaw Clutch Couplings, always state whether right or left hand is wanted.

A Right Hand Spiral Jaw Clutch Coupling drives when turning to the right as you face the smooth end.

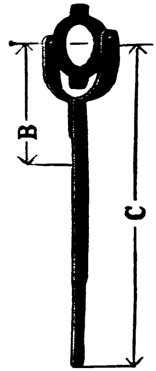
Clutch Bands and Shifting Levers



Style No. 1
Fig. 1054

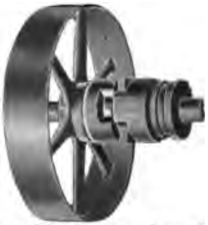
Size of Shaft, Inches	Clutch Band, Each	Style No. 1 Lever Including Band, Each	Style No. 2 Lever Including Band, Each
$\frac{15}{16}$	$1.40	$ 7.50	$ 6.00
$1\frac{3}{16}$	1.55	8.00	6.50
$1\frac{7}{16}$	1.70	8.50	7.00
$1\frac{11}{16}$	1.85	9.00	7.50
$1\frac{15}{16}$	2.05	9.50	8.00
$2\frac{3}{16}$	2.40	10.50	9.00
$2\frac{7}{16}$	2.40	10.50	9.00
$2\frac{11}{16}$	2.75	12.00	10.00
$2\frac{15}{16}$	3.00	13.00	11.00
$3\frac{3}{16}$	3.25	14.50	12.00
$3\frac{7}{16}$	3.50	16.50	13.50
$3\frac{11}{16}$	4.25	20.00	16.50
$3\frac{15}{16}$	5.00	23.00	18.50

Clutch Bands are cast iron, bored, turned and split. When ordering Shifting Levers, state whether No. 1 or No. 2 is wanted.

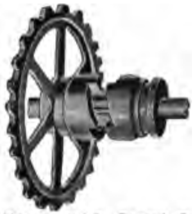


Style No. 2
Fig. 1055

Jaw Clutches as Applied to Pulleys, Etc.



Pulley with Square Jaw Clutch
Fig. 1056



Sprocket Wheel with Spiral Jaw Clutch
Fig. 1057

Jaw Clutches may be used with pulleys, gears, sheaves, sprocket wheels, drums, etc. By casting one-half of the Jaw Clutch Coupling as a part of the hub of the pulley or sprocket wheel, they may be thrown in and out of gear by engaging or disengaging the sliding half of the Jaw Clutch. In addition to the charge for the sliding half of the Jaw Clutch, and the clutch band and shifting lever, prices given in column "Jaw Clutch Hub" are added to the cost of the pulley, gear, sprocket wheel, etc., for the Jaw Clutch Hub.

When ordering, state whether pulley, sprocket wheel, etc., or Jaw Clutch is to drive; also send sketch showing arrangement of Jaw Clutch and direction shaft revolves.

Key to Prices and Dimensions of Intermediate Sizes of Bearings

FOR SHAFT OR BORE

$\frac{15}{16}$ to $1\frac{1}{4}$-inch, Inclusive.....Same as $1\frac{3}{16}$-inch
$1\frac{5}{16}$ to $1\frac{1}{2}$-inch, Inclusive.....Same as $1\frac{7}{16}$-inch
$1\frac{9}{16}$ to $1\frac{3}{4}$-inch, Inclusive.....Same as $1\frac{11}{16}$-inch
$1\frac{13}{16}$ to 2 -inch, Inclusive.....Same as $1\frac{15}{16}$-inch
$2\frac{1}{16}$ to $2\frac{1}{4}$-inch, Inclusive.....Same as $2\frac{3}{16}$-inch
$2\frac{5}{16}$ to $2\frac{1}{2}$-inch, Inclusive.....Same as $2\frac{7}{16}$-inch
$2\frac{9}{16}$ to $2\frac{3}{4}$-inch, Inclusive.....Same as $2\frac{11}{16}$-inch
$2\frac{13}{16}$ to 3 -inch, Inclusive.....Same as $2\frac{15}{16}$-inch
$3\frac{1}{16}$ to $3\frac{1}{4}$-inch, Inclusive.....Same as $3\frac{3}{16}$-inch
$3\frac{5}{16}$ to $3\frac{1}{2}$-inch, Inclusive.....Same as $3\frac{7}{16}$-inch
$3\frac{9}{16}$ to $3\frac{3}{4}$-inch, Inclusive.....Same as $3\frac{11}{16}$-inch
$3\frac{13}{16}$ to 4 -inch, Inclusive.....Same as $3\frac{15}{16}$-inch
$4\frac{1}{16}$ to $4\frac{1}{2}$-inch, Inclusive.....Same as $4\frac{7}{16}$-inch
$4\frac{9}{16}$ to 5 -inch, Inclusive.....Same as $4\frac{15}{16}$-inch
$5\frac{1}{16}$ to $5\frac{1}{2}$-inch, Inclusive.....Same as $5\frac{7}{16}$-inch
$5\frac{9}{16}$ to 6 -inch, Inclusive.....Same as $5\frac{15}{16}$-inch
$6\frac{1}{16}$ to $6\frac{1}{2}$-inch, Inclusive.....Same as $6\frac{7}{16}$-inch
$6\frac{9}{16}$ to 7 -inch, Inclusive.....Same as $6\frac{15}{16}$-inch
$7\frac{1}{16}$ to $7\frac{1}{2}$-inch, Inclusive.....Same as $7\frac{7}{16}$-inch
$7\frac{9}{16}$ to 8 -inch, Inclusive.....Same as $7\frac{15}{16}$-inch

ABOVE DOES NOT APPLY WHERE INTERMEDIATE SIZES ARE LISTED

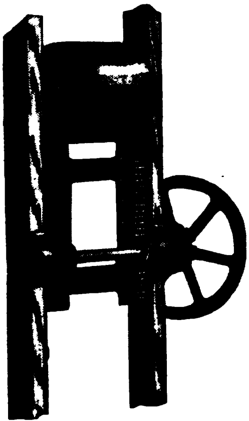


Fig. 1058

Rack and Pinion Belt Tighteners

FOR BELTS RUNNING IN ANY PLANE

To be supported between timbers. Hand wheel can be placed on either side.

Number	Length of Adjustment, Inches	Pulley		Price, Each
		Diameter, Inches	Face, Inches	
00	18	12	9	$ 30.00
0	20	18	12	40.00
1	24	24	14	56.00
2	42	28	20	82.00
3	48	36	28	120.00
4	60	42	38	250.00

Iron Screw Belt Clamps

FOR TIGHTENING AND PUTTING TOGETHER LARGE BELTS

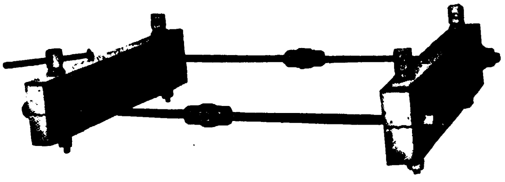


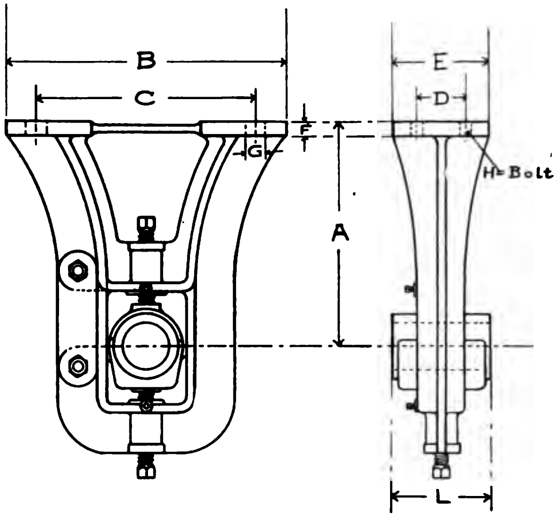
Fig. 1059

The frame is made of rock maple, with corrugated jaws, which makes it practically impossible for the belt to slip after having been properly placed in the clamp.

The rods are provided with machine cut right and left hand threads and extra long nuts.

Number	1	2	3	4	5	6
For belts in width ....inches	12	14	16	18	24	36
Price complete ....each	$14.50	16.50	18.50	20.00	26.00	32.00

DIMENSIONS OF ADJUSTABLE BALL AND SOCKET DOUBLE BRACED DROP HANGERS WITH PLAIN OR RING OILING BEARINGS



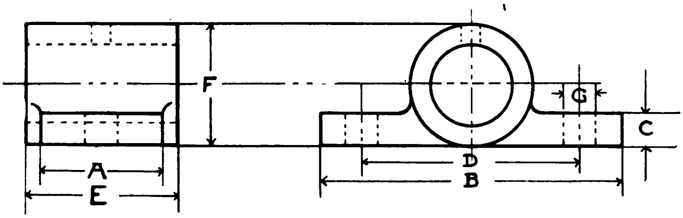
PLAIN OILING BEARING		RING OILING BEARING		A	B	C	D	E	F	G	H
SIZE	L	SIZE	L								
		1 3/16	5 1/4	8	10 1/2	8 1/2	1 3/4	3 1/2	7/8	1	4-1/2
1 3/16	4 1/2			10	12	9 3/4	2	3 3/4	7/8	1	4-1/2
				12	13	11	2 1/4	4	7/8	1	4-1/2
1 7/16	5 1/4			14	15	11 3/4	2 3/8	4 1/2	7/8	1	4-1/2
				16	16 1/2	13	2 1/2	5	1	1	4-1/2
1 11/16	6			18	18	15	2 3/4	5	1	1 1/4	4-5/8
				20	19	16	2 3/4	5	1	1 1/2	4-5/8
				10	13 1/2	10 1/8	2	4	1	1	4-1/2
1 15/16	6 3/4	1 7/16	6 1/4	12	14 1/2	11 1/8	2 1/4	4 1/2	1	1	4-1/2
				14	16	12 1/2	2 5/8	5	1	1	4-1/2
				16	17 1/2	13 3/4	2 3/4	5	1	1 1/4	4-5/8
2 3/16	7 1/2	1 11/16	7 3/16	18	19	15 1/4	2 3/4	5	1	1 1/4	4-5/8
				20	19 1/2	16 1/4	3 1/4	5 1/2	1	1 1/4	4-5/8
				24	22	18 1/4	3 1/2	6	1	1 1/4	4-5/8

DIMENSIONS OF ADJUSTABLE BALL AND SOCKET DOUBLE BRACED DROP HANGERS WITH PLAIN OR RING OILING BEARINGS

[CONTINUED]

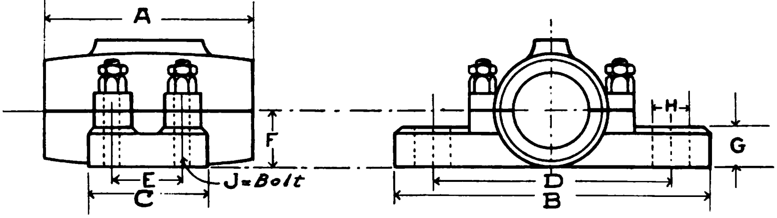
PLAIN OILING BEARING		RING OILING BEARING		A	B	C	D	E	F	G	H
SIZE	L	SIZE	L								
2 7/16	8 1/4	1 15/16	8 1/4	10	14 1/2	11 3/4	2 1/2	5	1 1/4	1 1/4	4-5/8
				12	15 3/4	13 1/4	2 1/2	5	1 1/4	1 1/4	4-5/8
				14	16 1/2	14 1/4	2 3/4	5 3/8	1 1/4	1 1/4	4-5/8
				16	17 1/2	15	2 3/4	5 3/8	1 1/4	1 1/2	4-5/8
2 11/16	9	2 3/16	9 1/2	18	19 1/4	16 1/4	3	5 3/4	1 1/4	1 1/2	4-5/8
				20	19 1/2	16 1/2	3 1/4	6 1/4	1 1/4	1 1/2	4-5/8
				24	22	18 1/2	3 1/2	6 3/4	1 1/4	1 1/2	4-5/8
2 15/16	9 1/4	2 7/16	10 1/2	12	16 3/4	13 5/8	2 3/4	5 3/4	1 1/4	1 1/2	4-5/8
				14	17 3/4	14 3/8	2 3/4	5 7/8	1 1/4	1 5/8	4-3/4
				16	19 1/4	15 7/8	3	6 1/8	1 1/4	1 5/8	4-3/4
3 3/16	10 1/2	2 11/16	11	18	20 1/4	17	3 3/8	6 1/4	1 1/4	1 5/8	4-3/4
				20	21	16 1/2	3 1/2	6 3/4	1 1/4	1 5/8	4-3/4
				24	24	19 1/4	4 1/4	7 1/4	1 1/4	1 5/8	4-3/4
3 7/16	11 1/4	2 15/16	12	14	17	14 1/4	3 1/2	6	1 1/2	1 3/8	4-3/4
				16	19 1/2	15 1/4	3 1/2	6 1/2	1 1/2	1 1/2	4-3/4
				18	21	16 3/4	4	6 3/4	1 1/2	1 1/2	4-3/4
3 11/16	12	3 3/16	13	20	22 1/2	18	4 1/4	7	1 1/2	1 1/2	4-3/4
				24	25	20 1/4	5	8 1/2	1 1/2	1 1/2	4-3/4
3 15/16	12 3/4	3 7/16	14	16	20	15 1/2	3 3/4	6 3/4	1 3/8	1 3/4	4-7/8
				18	22	17 3/4	4	7	1 3/8	2	4-7/8
4 3/16	13 1/2	3 11/16	15	20	24	19	4 1/4	7 1/2	1 3/8	2 1/4	4-7/8
				24	27	22	5	8 1/4	1 3/8	2 1/2	4-7/8

DIMENSIONS OF DOLLY BOXES



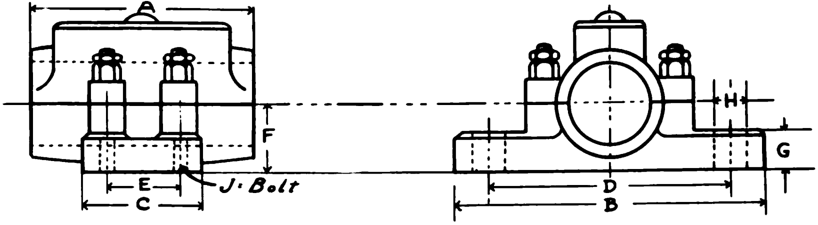
SIZE	A	B	C	D	E	F	G
$\frac{3}{4}$	$1\frac{1}{4}$	$4\frac{3}{8}$	$\frac{7}{16}$	$2\frac{7}{8}$	$1\frac{3}{4}$	$1\frac{3}{8}$	$\frac{3}{4}$
$\frac{7}{8}$	$1\frac{1}{4}$	$4\frac{3}{8}$	$\frac{7}{16}$	$2\frac{7}{8}$	$1\frac{3}{4}$	$1\frac{3}{8}$	$\frac{3}{4}$
$\frac{15}{16}$	$1\frac{1}{2}$	$4\frac{7}{8}$	$\frac{1}{2}$	$3\frac{1}{8}$	2	$1\frac{5}{8}$	$\frac{3}{4}$
1	$1\frac{1}{2}$	$4\frac{7}{8}$	$\frac{1}{2}$	$3\frac{1}{8}$	2	$1\frac{5}{8}$	$\frac{3}{4}$
$1\frac{1}{8}$	$1\frac{3}{4}$	$5\frac{1}{2}$	$\frac{9}{16}$	$3\frac{3}{4}$	$2\frac{5}{8}$	$1\frac{15}{16}$	$\frac{3}{4}$
$1\frac{3}{16}$	$1\frac{3}{4}$	$5\frac{1}{2}$	$\frac{9}{16}$	$3\frac{3}{4}$	$2\frac{5}{8}$	$1\frac{15}{16}$	$\frac{3}{4}$
$1\frac{5}{16}$	2	$5\frac{3}{4}$	$\frac{9}{16}$	4	$2\frac{5}{8}$	$2\frac{1}{8}$	1
$1\frac{7}{16}$	$2\frac{3}{16}$	$6\frac{1}{4}$	$\frac{9}{16}$	$4\frac{1}{4}$	$2\frac{7}{8}$	$2\frac{3}{8}$	1
$1\frac{11}{16}$	$2\frac{5}{8}$	$6\frac{1}{2}$	$\frac{5}{8}$	$4\frac{1}{2}$	$3\frac{3}{8}$	$2\frac{5}{8}$	1
$1\frac{15}{16}$	3	7	$\frac{5}{8}$	$4\frac{3}{4}$	$3\frac{7}{8}$	3	1

DIMENSIONS OF COMMON FLAT BOXES



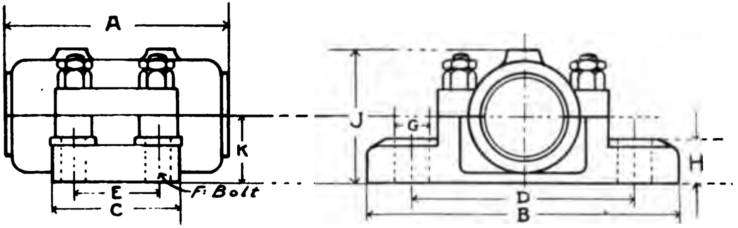
SIZE	A	B	C	D	E	F	G	H	J
$\frac{3}{4}$	$2\frac{3}{4}$	$6\frac{3}{4}$	$1\frac{5}{8}$	$4\frac{3}{4}$		1	$\frac{3}{4}$	$1\frac{1}{8}$	$\frac{1}{2}$
$\frac{15}{16}$	$2\frac{3}{4}$	$6\frac{3}{4}$	$1\frac{5}{8}$	$4\frac{3}{4}$		1	$\frac{3}{4}$	$1\frac{1}{8}$	$\frac{1}{2}$
1	$2\frac{3}{4}$	$6\frac{3}{4}$	$1\frac{5}{8}$	$4\frac{3}{4}$		1	$\frac{3}{4}$	$1\frac{1}{8}$	$\frac{1}{2}$
$1\frac{3}{16}$	$3\frac{3}{8}$	$7\frac{1}{4}$	2	$5\frac{1}{16}$		$1\frac{1}{8}$	$\frac{13}{16}$	$1\frac{3}{16}$	$\frac{1}{2}$
$1\frac{7}{16}$	$4\frac{1}{4}$	8	$2\frac{5}{16}$	$5\frac{1}{2}$		$1\frac{1}{4}$	$\frac{15}{16}$	$1\frac{1}{2}$	$\frac{5}{8}$
$1\frac{11}{16}$	$4\frac{3}{4}$	$8\frac{3}{4}$	$2\frac{5}{8}$	$6\frac{3}{16}$		$1\frac{5}{8}$	1	$1\frac{5}{16}$	$\frac{5}{8}$
$1\frac{15}{16}$	$5\frac{3}{4}$	$9\frac{3}{4}$	3	7		$1\frac{11}{16}$	$1\frac{1}{8}$	$1\frac{3}{8}$	$\frac{5}{8}$
$2\frac{3}{16}$	$6\frac{1}{2}$	$9\frac{1}{2}$	$3\frac{9}{16}$	$6\frac{7}{8}$		2	$1\frac{1}{8}$	$1\frac{3}{8}$	$\frac{5}{8}$
$2\frac{7}{16}$	$7\frac{1}{4}$	10	$3\frac{3}{4}$	$7\frac{1}{8}$		2	$1\frac{5}{16}$	$1\frac{3}{8}$	$\frac{5}{8}$
$2\frac{11}{16}$	8	$11\frac{1}{2}$	$4\frac{1}{8}$	$8\frac{3}{8}$		$2\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$\frac{5}{8}$
$2\frac{15}{16}$	$8\frac{3}{4}$	12	$4\frac{3}{4}$	$8\frac{11}{16}$	$2\frac{1}{4}$	$2\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$\frac{3}{4}$
$3\frac{3}{16}$	$9\frac{1}{2}$	$12\frac{1}{2}$	5	$9\frac{1}{8}$	$2\frac{5}{8}$	$2\frac{5}{8}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$\frac{3}{4}$
$3\frac{7}{16}$	10	13	$5\frac{3}{8}$	$9\frac{5}{8}$	3	$2\frac{7}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$\frac{3}{4}$
$3\frac{11}{16}$	$10\frac{3}{4}$	$13\frac{1}{2}$	$5\frac{5}{8}$	$10\frac{1}{8}$	$3\frac{1}{4}$	3	$1\frac{5}{8}$	$1\frac{3}{4}$	$\frac{3}{4}$
$3\frac{15}{16}$	$11\frac{1}{2}$	14	6	$10\frac{5}{8}$	$3\frac{1}{2}$	$3\frac{1}{8}$	$1\frac{5}{8}$	$1\frac{3}{4}$	$\frac{3}{4}$

DIMENSIONS OF WICK-OILING RIGID PILLOW BLOCKS



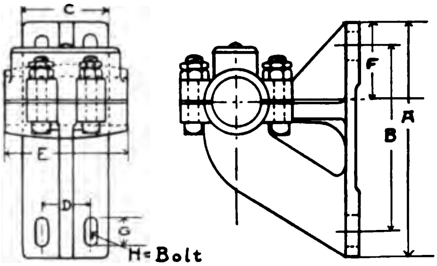
SIZE	A	B	C	D	E	F	G	H	J
1	2 3/4	6 3/4	1 5/8	4 3/4		1	3/4	1 1/8	1/2
1 3/16	3 3/8	7 1/4	2	5 1/16		1 1/8	13/16	1 3/16	1/2
1 7/16	4 1/4	8	2 5/16	5 1/2		1 1/4	15/16	1 1/2	5/8
1 11/16	4 3/4	8 3/4	2 5/8	6 3/16		1 5/8	1	1 5/16	5/8
1 15/16	5 3/4	9 3/4	3	7		1 11/16	1 1/8	1 3/8	5/8
2 3/16	6 1/2	9 1/2	3 9/16	6 7/8		2	1 1/8	1 3/8	5/8
2 7/16	7 1/4	10	3 3/4	7 1/8		2	1 5/16	1 3/8	5/8
2 11/16	8	11 1/2	4 1/8	8 3/8		2 1/4	1 3/8	1 3/8	5/8
2 15/16	8 3/4	12	4 3/4	8 11/16	2 1/4	2 1/2	1 1/2	1 1/2	3/4
3 3/16	9 1/2	12 1/2	5	9 1/8	2 5/8	2 5/8	1 1/2	1 1/2	3/4
3 7/16	10	13	5 3/8	9 5/8	3	2 7/8	1 1/2	1 3/4	3/4
3 11/16	10 3/4	13 1/2	5 5/8	10 1/8	3 1/4	3	1 5/8	1 3/4	3/4
3 15/16	11 1/2	14	6	10 5/8	3 1/2	3 1/8	1 5/8	1 3/4	3/4

DIMENSIONS OF RING-OILING RIGID PILLOW BLOCKS



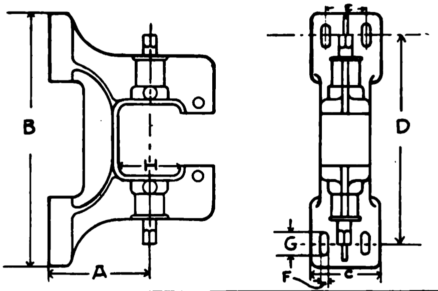
SIZE	A	B	C	D	E	F	G	H	J	K
1 3/16	5 1/4	7 7/8	3 1/4	6		2 - 1/2	1 1/8	1 1/4	3 5/8	2
1 7/16	6 1/4	8 1/4	3 3/4	6 3/8		2 - 1/2	1 1/8	1 1/4	3 11/16	2 1/8
1 11/16	7 3/16	8 7/8	4	7		2 - 1/2	1 1/8	1 1/2	4 1/8	2 3/8
1 15/16	8 1/4	9 7/8	4 1/2	7 3/4	2 1/2	4 - 5/8	1 1/8	1 1/2	4 7/16	2 9/16
2 3/16	9	10 7/8	4 3/4	8 3/8	2 1/2	4 - 5/8	1 3/8	1 15/16	4 15/16	2 3/4
2 7/16	9 3/4	11 1/8	5 1/4	8 5/8	3	4 - 5/8	1 1/4	2	5 3/8	2 15/16
2 11/16	10 5/8	11 1/2	5 1/2	8 7/8	3 3/16	4 - 5/8	1 1/4	2 1/4	5 9/16	3 1/8
2 15/16	11 1/4	11 5/8	5 3/4	9 1/8	3 1/2	4 - 5/8	1 1/4	2 1/4	5 9/16	3 1/8
3 3/16	12	11 7/8	6 1/8	9 3/8	3 5/8	4 - 5/8	1 1/4	2 3/8	5 13/16	3 3/8
3 7/16	12 13/16	12 7/8	6 1/2	10 1/8	3 3/4	4 - 3/4	1 1/2	2 7/16	6 5/8	3 3/4
3 11/16	13 1/2	13 1/2	7	10 3/4	3 7/8	4 - 3/4	1 1/2	2 11/16	6 15/16	3 13/16
3 15/16	14 1/4	14	7 1/2	11 3/8	4	4 - 3/4	1 1/2	2 13/16	7 7/16	4 1/16

DIMENSIONS OF WICK-OILING RIGID POST BEARINGS



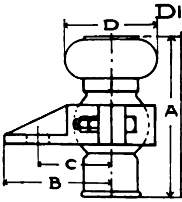
SIZE	A	B	C	D	E	F	G	H
$\frac{7}{8}$	$8\frac{1}{8}$	$6\frac{1}{4}$	3	$1\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{1}{4}$	1	$4-\frac{1}{2}$
$\frac{15}{16}$	$8\frac{1}{8}$	$6\frac{1}{4}$	3	$1\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{1}{4}$	1	$4-\frac{1}{2}$
1	$9\frac{1}{4}$	7	$3\frac{1}{4}$	$1\frac{3}{4}$	$3\frac{3}{8}$	$2\frac{3}{4}$	$1\frac{1}{4}$	$4-\frac{1}{2}$
$1\frac{3}{16}$	$9\frac{1}{4}$	7	$3\frac{1}{4}$	$1\frac{3}{4}$	$3\frac{3}{8}$	$2\frac{3}{4}$	$1\frac{1}{4}$	$4-\frac{1}{2}$
$1\frac{7}{16}$	10	8	$3\frac{3}{8}$	$1\frac{7}{8}$	$4\frac{1}{4}$	$2\frac{7}{8}$	$1\frac{1}{4}$	$4-\frac{1}{2}$
$1\frac{11}{16}$	$10\frac{3}{4}$	$8\frac{1}{4}$	4	$2\frac{1}{4}$	$4\frac{3}{4}$	$3\frac{1}{8}$	$1\frac{1}{2}$	$4-\frac{5}{8}$
$1\frac{15}{16}$	$11\frac{3}{4}$	$8\frac{3}{4}$	$4\frac{1}{4}$	$2\frac{1}{2}$	$5\frac{3}{4}$	$3\frac{3}{8}$	$1\frac{1}{2}$	$4-\frac{5}{8}$
$2\frac{3}{16}$	$13\frac{3}{4}$	$10\frac{1}{2}$	$5\frac{1}{8}$	$2\frac{7}{8}$	$6\frac{1}{2}$	$3\frac{5}{8}$	$1\frac{3}{4}$	$4-\frac{5}{8}$
$2\frac{7}{16}$	$14\frac{1}{2}$	$11\frac{1}{2}$	$5\frac{1}{2}$	$3\frac{1}{4}$	$7\frac{1}{4}$	$3\frac{7}{8}$	$1\frac{3}{4}$	$4-\frac{3}{4}$
$2\frac{11}{16}$	15	12	$5\frac{7}{8}$	$3\frac{5}{8}$	8	$4\frac{1}{8}$	$1\frac{3}{4}$	$4-\frac{3}{4}$
$2\frac{15}{16}$	$15\frac{3}{4}$	$12\frac{1}{2}$	$6\frac{1}{4}$	4	$8\frac{3}{4}$	$4\frac{1}{2}$	$1\frac{3}{4}$	$4-\frac{3}{4}$

DIMENSIONS OF ADJUSTABLE BALL AND SOCKET DOUBLE BRACED POST HANGERS



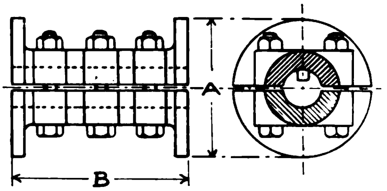
SIZE									
RING OILING	PLAIN OILING	A	B	C	D	E	F	G	H
$1\frac{3}{16}$	$1\frac{3}{16}-1\frac{7}{16}-1\frac{11}{16}$	6	$12\frac{1}{2}$	4	$9\frac{1}{2}$	2	$\frac{1}{2}$	1	$3\frac{1}{16}$
$1\frac{7}{16}-1\frac{11}{16}$	$1\frac{15}{16}-2\frac{3}{16}$	6	15	4	12	2	$\frac{1}{2}$	1	$3\frac{3}{4}$
$1\frac{15}{16}-2\frac{3}{16}$	$2\frac{7}{16}-2\frac{11}{16}$	6	17	$4\frac{1}{2}$	$13\frac{3}{4}$	$2\frac{1}{4}$	$\frac{5}{8}$	$1\frac{1}{4}$	$4\frac{3}{8}$
$2\frac{7}{16}-2\frac{11}{16}$	$2\frac{15}{16}-3\frac{3}{16}$	$6\frac{1}{2}$	$19\frac{1}{2}$	$5\frac{1}{4}$	16	3	$\frac{3}{4}$	$1\frac{1}{2}$	$4\frac{7}{8}$
$2\frac{15}{16}-3\frac{3}{16}$	$3\frac{7}{16}-3\frac{11}{16}$	$7\frac{1}{2}$	$20\frac{1}{2}$	$5\frac{1}{2}$	17	$3\frac{1}{4}$	$\frac{3}{4}$	$1\frac{1}{2}$	$5\frac{3}{4}$
$3\frac{7}{16}-3\frac{11}{16}$	$3\frac{15}{16}-4\frac{3}{16}$	8	21	$6\frac{1}{4}$	$17\frac{1}{4}$	$3\frac{1}{2}$	$\frac{7}{8}$	$1\frac{3}{4}$	$6\frac{1}{4}$
$3\frac{15}{16}-4\frac{3}{16}$	$4\frac{7}{16}-4\frac{11}{16}$	$8\frac{1}{4}$	$21\frac{1}{2}$	7	$17\frac{3}{4}$	$3\frac{3}{4}$	$\frac{7}{8}$	$1\frac{3}{4}$	$7\frac{1}{8}$

DIMENSIONS OF VERTICAL BEARINGS



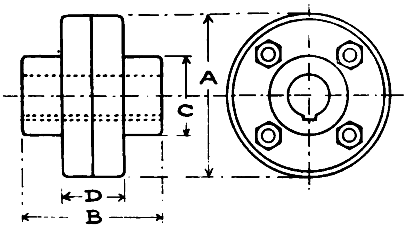
SIZE	$1\frac{3}{16}$	$1\frac{7}{16}$	$1\frac{11}{16}$	$1\frac{15}{16}$	$2\frac{3}{16}$	$2\frac{7}{16}$	$2\frac{11}{16}$	$2\frac{15}{16}$
A	5	6	7	8	9	$9\frac{1}{2}$	10	$10\frac{3}{4}$
B	$4\frac{1}{8}$	5	$5\frac{5}{8}$	$6\frac{1}{4}$	$6\frac{1}{2}$	$6\frac{7}{8}$	$7\frac{1}{4}$	$7\frac{3}{4}$
C	$3\frac{1}{8}$	$3\frac{3}{4}$	$4\frac{1}{8}$	$4\frac{5}{8}$	$4\frac{11}{16}$	$4\frac{3}{4}$	5	$5\frac{1}{4}$
D	$3\frac{5}{8}$	$3\frac{7}{8}$	$4\frac{1}{2}$	5	$5\frac{5}{8}$	$5\frac{7}{8}$	$6\frac{1}{8}$	$6\frac{3}{8}$

DIMENSIONS OF COMPRESSION COUPLINGS



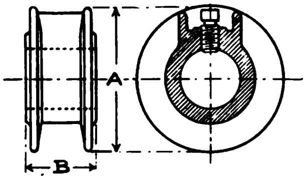
SIZE	A	B	Nº OF BOLTS.
1 3/16	4	5 3/8	4
1 7/16	5	6 5/16	4
1 11/16	5 1/4	7 1/8	4
1 15/16	5 3/4	7 15/16	6
2 3/16	6 3/8	8 3/4	6
2 7/16	6 3/4	9 3/4	6
2 11/16	7 1/4	10 5/8	6
2 15/16	7 3/4	11 7/16	6
3 3/16	8 1/4	12 5/16	6
3 7/16	8 3/4	13 1/4	6
3 11/16	9 1/4	14 1/4	6
3 15/16	10	15 1/4	6

DIMENSIONS OF FLANGE COUPLINGS



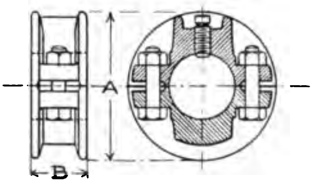
SIZE	A	B	C	D	Nº OF BOLTS.
1 3/16	6	4 1/4	2 1/2	2 1/2	4
1 7/16	6 1/2	5	3	3 1/8	4
1 11/16	7 1/4	5 1/2	3 1/2	3 1/8	4
1 15/16	8 1/8	6 1/4	3 7/8	3 1/2	4
2 3/16	8 5/8	7	4 3/8	3 1/2	4
2 7/16	9 1/4	7 1/2	4 7/8	3 3/4	6
2 11/16	10 1/8	8 1/4	5 3/8	4 1/8	6
2 15/16	10 5/8	9	5 7/8	4 3/8	6
3 3/16	11 3/8	9 1/2	6 1/2	4 3/8	6
3 7/16	12 1/2	10	7	4 1/2	6
3 11/16	13 1/8	10 1/2	7 1/2	4 3/4	6
3 15/16	13 5/8	10 3/4	8	4 3/4	6

DIMENSIONS OF SOLID SAFETY SET COLLARS



SIZE	A	B	SIZE	A	B	SIZE	A	B
1/2	2 1/4	1	1 3/16	2 11/16	1 3/8	2 7/16	4 11/16	1 7/8
3/4	2 1/4	1	1 5/16	2 11/16	1 3/8	2 11/16	4 15/16	1 7/8
7/8	2 3/8	1	1 7/16	3 9/16	1 5/8	2 15/16	5 3/16	1 7/8
15/16	2 7/16	1 1/8	1 11/16	3 13/16	1 5/8	3 7/16	5 5/8	1 7/8
1	2 7/16	1 1/8	1 15/16	4 3/16	1 5/8	3 11/16	5 7/8	1 7/8
1 1/8	2 11/16	1 3/8	2 3/16	4 7/16	1 7/8	3 15/16	6 1/8	1 7/8

DIMENSIONS OF SPLIT SAFETY SET COLLARS



SIZE	A	B	SIZE	A	B	SIZE	A	B
1/2	2 1/4	1	1 3/16	2 11/16	1 3/8	2 7/16	4 11/16	1 7/8
3/4	2 1/4	1	1 5/16	2 11/16	1 3/8	2 11/16	4 15/16	1 7/8
7/8	2 3/8	1	1 7/16	3 9/16	1 5/8	2 15/16	5 3/16	1 7/8
15/16	2 7/16	1 1/8	1 11/16	3 13/16	1 5/8	3 7/16	5 5/8	1 7/8
1	2 7/16	1 1/8	1 15/16	4 3/16	1 5/8	3 11/16	5 7/8	1 7/8
1 1/8	2 11/16	1 3/8	2 3/16	4 7/16	1 7/8	3 15/16	6 1/8	1 7/8

Standard Detachable Link Belting

Sprocket Wheels

Elevator Buckets

Elevator Bolts

Pages 384 to 394 Inclusive

Standard Detachable Link Belting

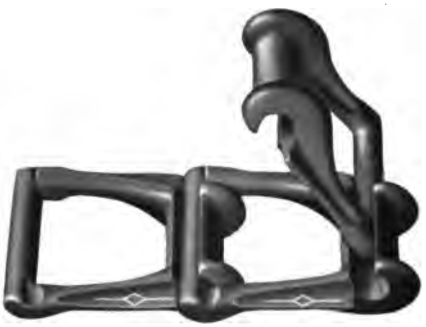


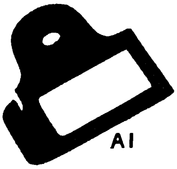
Fig. 1060

All our link belting is made of the very best refined malleable iron. The links are drop hammered and accurately pitched to length and subjected to severe stationary and operative tests and proved to far higher speed than should ever be required in practical operation and finally are tested to fully double the working strain given in the list, to insure as perfect goods as it is possible to produce.

LIST ADOPTED AUGUST 1st, 1913

Number	Plain Links, Per Foot	Couplers, Per Pair	Approximate Links Per 10 Feet	Maximum Power in Pounds
25	$0.13	$0.13	133	75
32	.13	.16	104	150
33	.13	.15	86	200
34	.13	.15	86	225
35	.13	.18	74	250
42	.15	.19	88	300
45	.13	.18	74	350
51	.19	.18	104	375
52	.18	.16	80	500
55	.16	.16	74	450
57	.18	.19	52	600
62	.22	.22	73	650
66	.23	.22	60	700
67	.23	.22	52	700
75	.24	.19	46	750
77	.25	.22	52	800
78	.34	.25	46	1000
83	.35	.32	30	1200
85	.44	.44	30	1300
88	.43	.28	46	1200
95	.53	.54	30	1600
103	.67	.58	39	1800
105	.54	...	20	1500
108	.63	.79	25½	2000
110	.74	.92	25	2000
114	.85	.84	37	2000
122	1.13	1.58	20	2200
124	1.03	1.19	30	2200
146	1.02	1.29	20	2800

Attachments for Standard Detachable Link Belting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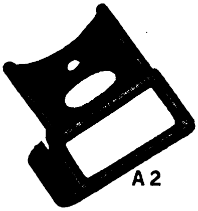
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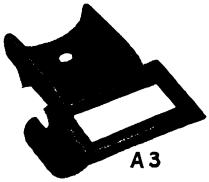
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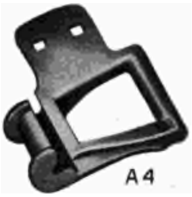
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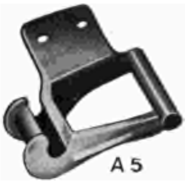
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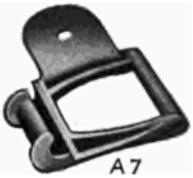
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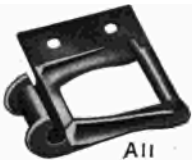
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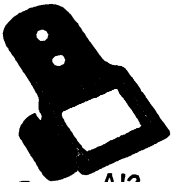
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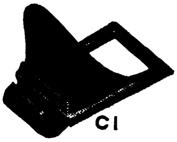
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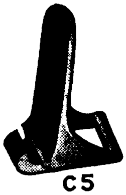
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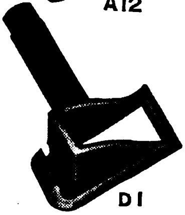
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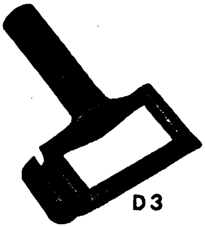
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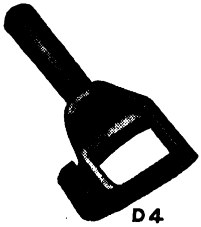
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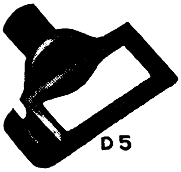
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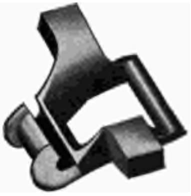
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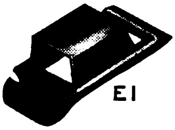
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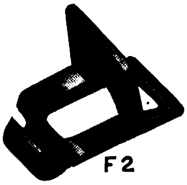
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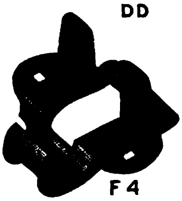
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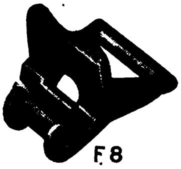
Attachments for Standard Detachable Link Belting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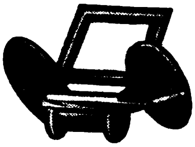
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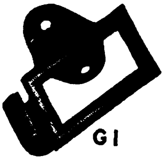
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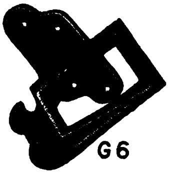
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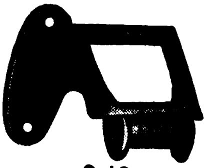
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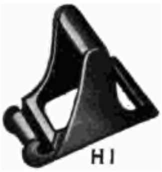
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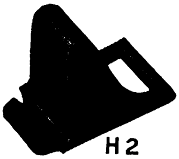
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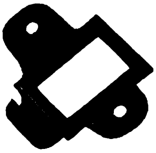
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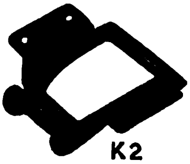
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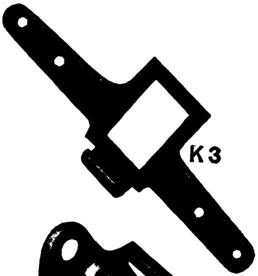
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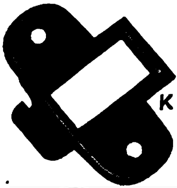
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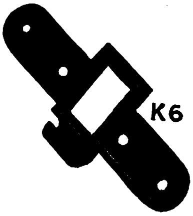
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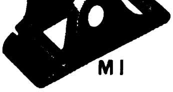
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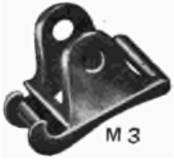
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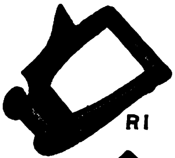
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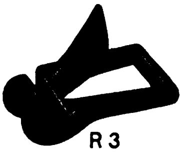
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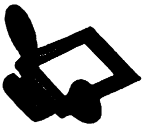
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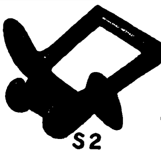
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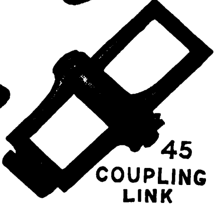

45 COUPLING LINK

Price List of Attachments

FOR STANDARD DETACHABLE LINK BELTING
PRICE—PER FOOT

No. 25	
A— 1	$0.24
A— 3	.25
C— 1	.32
D— 3	.29
E— 1	.24
G— 1	.31
H— 2	.31
K— 1	.29
K— 5	.26
K— 6	.32
M— 1	.30
S— 1	.30

No. 32	
A— 1	$0.27
A— 3	.24
C— 1	.36
D— 3	.30
E— 1	.24
G— 1	.28
K— 1	.33
K— 3	.43
K— 5	.26
K— 6	.42
M— 1	.36
S— 9	.46

No. 33	
A— 1	$0.19
C— 1	.29
D— 3	.43
E— 1	.20
K— 1	.28
K— 3	.43
K— 5	.28
K— 6	.39
M— 1	.32
S— 1	.28

No. 34	
A— 1	$0.24
C— 1	.37
E— 1	.27
K— 1	.32

No. 35	
A— 1	$0.26
A— 2	.36
C— 1	.36
E— 1	.28
K— 1	.36
K— 5	.33
S— 1	.30

No. 42	
A— 1	$0.26
A— 3	.39
C— 1	.35
E— 1	.24
K— 1	.32
K— 3	.45
K— 5	.29
K— 6	.45
S— 1	.30

No. 45	
A— 1	$0.22
A— 3	.31
C— 1	.30
D— 3	.38
D— 5	.36
E— 1	.24
F— 2	.30
G— 1	.26
H— 2	.39
K— 1	.29
K— 3	.38
K— 5	.28
M— 1	.28
S— 1	.26

No. 51	
A— 1	$0.28
C— 1	.38
D— 5	.48
K— 1	.36
K— 5	.37
R—18	.36
S— 1	.31

No. 52	
A— 1	$0.31
A— 3	.38
C— 1	.37
D— 3	.43
D—12	.41
E— 1	.37
F— 2	.48
G— 1	.36
K— 1	.39
K— 5	.36

No. 55	
A— 1	$0.28
A— 2	.36
A— 3	.36
C— 1	.35
D— 5	.39
E— 1	.28
F— 2	.39
K— 1	.31
K— 5	.33
M— 1	.32
S— 1	.28

No. 57	
A— 1	$0.33
A— 3	.37
D— 5	.41
E— 1	.30
F— 2	.48
H— 1	.46
H— 2	.49
K— 1	.39
M— 3	.46
S— 2	.36

No. 62	
A— 1	$0.36
A— 3	.38
C— 1	.43
D— 5	.50
K— 1	.39
K— 5	.37

No. 66	
C— 1	$0.44
D— 5	.64

No. 67	
A— 1	$0.36
A— 7	.41
A—11	.38
D— 5	.48
D—26	.50
FF½	.55
F— 2	.53
G— 1	.55
H— 1	.55
K— 1	.44
K— 3	.59
S— 2	.39

No. 75	
E— 1	$0.40
F— 2	.58
H— 1	.50
H— 2	.50
K— 1	.43
R— 1	.32
R— 8	.38

No. 77	
A— 1	$0.41
D— 5¾	.60
E— 1	.42
F— 2	.71
G— 1	.53
G— 6	.57
G—19	.57
H— 1	.53
H— 2	.57
K— 1	.47
M— 3	.60
R— 1	.36
R— 3	.40
S— 2	.43

No. 78	
A— 1	$0.51
A— 3	.65
A—11	.55
D— 5	.72
E— 1	.52
F— 2	.77
F— 4	.79
G— 1	.65
G— 6	.75
G—19	.73
H— 1	.73
H— 2	.77
H— 6	1.26
K— 1	.52
K— 3	.73
M— 3	.77
R— 1	.47
S— 2	.58

No. 83	
D— 5	$0.74
E— 1	.63
E— 2	.63
F— 2	1.02
G— 1	.82
M— 3	.83
M— 4	.92
M—11	.84

No. 85	
E— 1	$0.76
E— 2	.80
FF½	.98
F— 1	1.08
F— 2	1.02
F— 5	1.02
G— 6	.79
H— 1	.80
K— 2	.80
K— 4	.88
K— 7	.81
S— 2	.71

No. 88	
A— 3	$0.77
A— 7	.70
A—11	.66
E— 1	.71
F— 2	.88
F— 4	.79
F— 8	.98
F—12	.96
G— 6	.81
G— 8	.80
H— 1	.84
H— 2	.86
K— 1	.68
K— 8	.83
M— 3	.95
R— 1	.57
R— 2	.57
R— 8	.60
S— 2	.69
S— 2½	.65

No. 95	
F— 2	$1.21
H— 1	.95
H— 2	1.06
K— 2	.93

No. 103	
A— 1	$1.01
A— 4	1.04
A—11	1.01
A—24	1.08
D— 5	1.13
D—26	1.21
E— 1	1.04
F— 2	1.23
F— 3	1.57
F— 8	1.39
G— 6	1.25
G—10	1.25
G—19	1.20
H— 1	1.05
H— 2½	1.10
H— 3	1.36
H— 7	2.00
K— 1	1.05
K— 2	1.09
K— 8	1.06
L— 2	1.39
M— 3	1.28
R— 1	.91
R— 1½	.90
RR	1.05

No. 105	
F— 1	$0.76
K— 2	1.07
M— 3	1.26

No. 108	
FF	$1.24
F— 2	1.30
K— 2	1.13
R— 2	.92

No. 110	
F— 2	$1.40
K— 2	1.24

No. 114	
A— 2½	$1.22
A—11	1.17
A—24	1.21
DD	1.71
F— 8	1.47
K— 1	1.34
M— 3	1.38

No. 122	
F— 2	$1.74
K— 2	1.83

No. 124	
A— 4	$1.54
A—11	1.60
D— 5	1.91
F— 2	1.70
F— 8	2.03
G— 1	1.62
G— 6	1.74
K— 1	1.72
M— 3	1.75
R— 1	1.34

No. 146	
E— 2	$1.51
F— 2	1.64
F— 5	1.61
K— 2	1.94
K— 4	1.61

Where attachments are inserted at intervals add 10 per cent. to the total cost of plain links and attachment links used. This charge is made to cover labor involved inserting attachments.

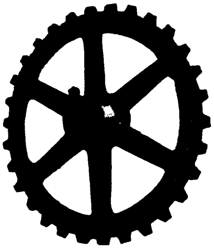


Fig. 1061

Sprocket Wheels

BORED AND KEY-SEATED OR SET-SCREWED
FOR STANDARD DETACHABLE LINK BELTING

Pitch Diameter, Inches	Number of Teeth	Price Each	
		Solid	Split
No. 25 Bore $1\frac{7}{16}$ Inches and Less			
1.52	5	$1.10	....
1.80	6	1.15	....
2.07	7	1.15	....
2.35	8	1.20	$2.35
2.61	9	1.20	2.35
2.90	10	1.25	2.40
3.12	11	1.30	2.45
3.49	12	1.35	2.50
3.76	13	1.40	2.55
4.08	14	1.45	2.60
4.35	15	1.50	2.65
4.60	16	1.50	2.70
4.90	17	1.55	2.75
5.22	18	1.55	2.75
5.48	19	1.60	2.80
5.74	20	1.65	2.85
6.09	21	1.70	2.90
6.36	22	1.70	2.90
6.86	24	1.75	2.95
7.21	25	1.80	3.00
7.52	26	1.80	3.05
7.80	27	1.80	3.05
8.12	28	1.85	3.10
8.40	29	1.85	3.10
8.65	30	1.90	3.15
9.24	32	1.95	3.20
9.77	34	2.05	3.30
10.12	35	2.10	3.35
10.38	36	2.15	3.45
10.92	38	2.20	3.50
12.07	42	2.40	3.75
12.64	44	2.55	3.90
13.81	48	2.60	4.00
14.97	52	2.80	4.25
16.09	56	3.00	4.50
17.25	60	3.25	4.75
18.45	64	3.50	5.05
22.04	77	4.50	6.25
24.13	84	5.00	6.80
No. 32 Bore $1\frac{7}{16}$ Inches and Less			
1.98	5	$1.15	....
2.31	6	1.20	....
2.63	7	1.25	....
3.01	8	1.30	$2.50
3.38	9	1.35	2.55
3.75	10	1.40	2.60
4.11	11	1.45	2.70
4.38	12	1.55	2.80
4.77	13	1.65	2.90
No. 32 Continued			
5.15	14	$1.70	$2.95
5.52	15	1.80	3.05
5.89	16	1.85	3.15
6.21	17	1.90	3.20
6.65	18	1.95	3.25
6.95	19	2.00	3.30
7.33	20	2.05	3.35
7.76	21	2.10	3.50
8.10	22	2.15	3.55
8.48	23	2.20	3.60
8.87	24	2.25	3.65
9.20	25	2.30	3.70
9.50	26	2.35	3.80
9.88	27	2.40	3.85
10.23	28	2.45	3.90
11.01	30	2.55	4.00
11.71	32	2.70	4.20
12.15	33	2.80	4.30
12.43	35	2.90	4.40
13.17	36	2.90	4.45
13.98	38	3.00	4.55
14.60	40	3.10	4.65
16.18	44	3.35	5.00
16.48	45	3.40	5.05
17.45	48	3.60	5.30
20.13	55	3.90	5.70
23.82	65	4.40	6.40
No. 33 See No. 34			
No. 34 Bore $1\frac{7}{16}$ Inches and Less			
2.77	6	$1.30	....
3.26	7	1.35	....
3.68	8	1.40	$2.70
4.09	9	1.45	2.75
4.57	10	1.50	2.80
4.97	11	1.60	2.95
5.42	12	1.70	3.05
5.82	13	1.75	3.10
6.28	14	1.80	3.15
6.76	15	1.90	3.25
7.18	16	2.00	3.40
8.00	18	2.10	3.50
8.46	19	2.20	3.60
8.96	20	2.30	3.70
9.40	21	2.35	3.85
9.82	22	2.40	3.90
10.27	23	2.45	3.95
No. 34 Continued			
10.76	24	$2.50	$4.00
11.04	25	2.60	4.10
12.15	27	2.70	4.25
12.47	28	2.80	4.35
13.44	30	2.90	4.45
14.25	32	3.00	4.65
15.15	34	3.20	4.85
15.60	35	3.25	4.90
16.03	36	3.30	5.05
16.88	38	3.40	5.15
18.17	41	3.65	5.50
18.69	42	3.70	5.55
23.98	54	4.90	6.95
27.88	63	5.85	8.20
No. 35 See No. 45			
No. 42 Bore $1\frac{11}{16}$ Inches and Less			
2.37	5	$1.50	....
2.72	6	1.60	....
3.18	7	1.70	....
3.53	8	1.80	$3.10
3.99	9	1.90	3.20
4.43	10	1.95	3.25
4.83	11	1.95	3.30
5.26	12	2.00	3.35
5.71	13	2.05	3.40
6.16	14	2.10	3.45
6.59	15	2.15	3.50
7.01	16	2.20	3.60
7.46	17	2.25	3.65
7.87	18	2.30	3.70
8.34	19	2.35	3.75
8.75	20	2.40	3.80
9.25	21	2.45	3.95
9.61	22	2.50	4.00
10.50	24	2.60	4.10
11.78	27	2.80	4.35
12.24	28	2.90	4.45
13.94	32	3.20	4.85
15.64	36	3.60	5.35
16.52	38	3.80	5.55
17.05	39	3.90	5.65
17.47	40	3.95	5.70
17.83	41	4.00	5.85
20.08	46	4.50	6.45
23.92	55	5.50	7.55

Note.—These prices cover wheels with bores as specified above. For wheels having hubs and bores larger than standard or otherwise special, additional charge will be made as shown on Page 392.

Sprocket Wheels

FOR STANDARD DETACHABLE LINK BELTING

No. 45

Bore $1\frac{15}{16}$ Inches and Less

Pitch Diameter, Inches	Number of Teeth	Price Each Solid	Price Each Split
2.75	5	$1.50	....
3.15	6	1.60	....
3.78	7	1.70	....
4.28	8	1.80	$3.20
4.80	9	1.90	3.30
5.28	10	2.00	3.40
5.76	11	2.10	3.60
6.24	12	2.20	3.70
6.77	13	2.30	3.80
7.30	14	2.40	3.90
7.80	15	2.50	4.00
8.32	16	2.60	4.20
8.84	17	2.70	4.30
9.37	18	2.80	4.40
9.85	19	2.90	4.50
10.37	20	3.00	4.60
10.92	21	3.10	4.85
11.47	22	3.20	4.95
11.93	23	3.30	5.05
12.44	24	3.40	5.15
12.95	25	3.50	5.25
13.46	26	3.60	5.50
13.98	27	3.70	5.60
14.54	28	3.80	5.70
15.03	29	3.90	5.80
15.50	30	4.00	5.90
16.05	31	4.10	6.10
16.48	32	4.20	6.20
18.11	35	4.60	6.60
18.68	36	4.70	6.85
19.70	38	4.95	7.10
20.21	39	5.10	7.25
20.68	40	5.20	7.35
21.75	42	5.40	7.75
22.83	44	5.80	8.15
23.27	45	6.00	8.35
23.75	46	6.20	8.80
24.79	48	6.50	9.10
26.11	50	6.80	9.40
27.95	54	7.50	10.35
30.08	58	8.30	11.40
35.74	69	11.00	14.60
40.38	78	13.70	17.85
42.48	82	15.00	19.35

No. 51

Bore $1\frac{15}{16}$ Inches and Less

Pitch Diameter, Inches	Number of Teeth	Price Each Solid	Price Each Split
1.98	5	$1.40	....
2.67	7	1.50	....
3.03	8	1,55	$2.75
3.47	9	1.60	2.80
3.73	10	1.65	2.85
4.12	11	1.70	2.95
4.52	12	1.75	3.00
4.88	13	1.80	3.05
5.25	14	1.85	3.10
5.57	15	1.90	3.15
5.92	16	1.95	3.25
6.30	17	2.00	3.30
6.71	18	2.05	3.35
7.08	19	2.10	3.40
7.42	20	2.15	3.45
7.83	21	2.20	3.60

No. 51

Continued

Pitch Diameter, Inches	Number of Teeth	Price Each Solid	Price Each Split
8.10	22	$2.25	$3.65
8.54	23	2.30	3.70
8.91	24	2.35	3.75
9.20	25	2.40	3.80
9.65	26	2.45	3.90
9.98	27	2.50	3.95
10.34	28	2.55	4.00
10.76	29	2.60	4.05
11.05	30	2.70	4.15
11.87	32	2.85	4.35
12.22	33	2.90	4.40
12.58	34	2.95	4.45
13.00	35	3.00	4.50
13.37	36	3.05	4.60
14.35	39	3.20	4.75
16.56	45	3.70	5.35
18.40	50	4.10	5.85
20.32	55	4.60	6.50

No. 52

Bore $1\frac{15}{16}$ Inches and Less

Pitch Diameter, Inches	Number of Teeth	Price Each Solid	Price Each Split
2.99	6	$1.50	....
3.48	7	1.60	....
3.94	8	1.70	$3.10
4.40	9	1.80	3.20
4.89	10	1.90	3.30
5.35	11	2.00	3.50
5.80	12	2.10	3.60
6.31	13	2.20	3.70
6.72	14	2.30	3.80
7.22	15	2.40	3.90
7.77	16	2.50	4.10
8.20	17	2.60	4.20
8.68	18	2.70	4.30
9.13	19	2.75	4.35
9.62	20	2.80	4.40
10.07	21	2.90	4.60
10.61	22	3.00	4.70
11.07	23	3.10	4.80
11.54	24	3.15	4.85
11.96	25	3.20	4.90
12.45	26	3.30	5.10
12.91	27	3.40	5.20
13.47	28	3.45	5.25
14.35	30	3.60	5.40
15.33	32	3.80	5.70
16.30	34	4.00	5.90
17.22	36	4.15	6.15
17.77	37	4.20	6.20
18.19	38	4.30	6.30
18.66	39	4.45	6.45
19.17	40	4.60	6.60
20.09	42	4.80	6.90
22.02	46	5.20	7.45
23.46	49	5.60	7.85
24.47	51	5.80	8.25
26.37	55	6.40	8.85
27.80	58	6.75	9.35
28.65	60	7.00	9.60
30.70	64	8.00	10.80

No. 55

See No. 45

No. 57

See No. 67

No. 62

Bore $2\frac{7}{16}$ Inches and Less

Pitch Diameter, Inches	Number of Teeth	Price Each Solid	Price Each Split
3.30	6	$1.75	....
3.77	7	1.85	....
4.30	8	1.95	$3.45
4.81	9	2.05	3.55
5.37	10	2.15	3.65
5.92	11	2.25	3.85
6.41	12	2.40	4.00
6.93	13	2.55	4.15
7.46	14	2.70	4.30
7.95	15	2.85	4.45
8.49	16	3.00	4.75
8.99	17	3.10	4.85
9.52	18	3.20	4.95
10.05	19	3.35	5.10
10.60	20	3.50	5.25
11.01	21	3.60	5.50
11.58	22	3.80	5.70
12.05	23	4.00	5.90
12.65	24	4.15	6.05
13.60	26	4.45	6.55
14.68	28	4.70	6.80
15.77	30	5.10	7.20
16.81	32	5.35	7.60
17.85	34	5.60	7.85
18.96	36	5.90	8.35
19.95	38	6.20	8.65
22.61	43	7.00	9.65
23.58	45	7.40	10.05
25.22	48	8.10	11.05
25.68	49	8.30	11.25
26.23	50	8.50	11.45
27.32	52	8.90	12.15
30.40	58	10.20	13.75
35.71	68	12.20	16.35

No. 65

Bore $2\frac{7}{16}$ Inches and Less

Pitch Diameter, Inches	Number of Teeth	Price Each Solid	Price Each Split
5.59	8	$2.40	$3.85
6.30	9	2.60	4.05

No. 66

Bore $2\frac{7}{16}$ Inches and Less

Pitch Diameter, Inches	Number of Teeth	Price Each Solid	Price Each Split
4.64	7	$1.80	....
5.25	8	1.90	$3.35
5.92	9	2.00	3.45
6.57	10	2.10	3.55
7.20	11	2.20	3.75
7.81	12	2.30	3.85
8.44	13	2.50	4.05
10.40	16	2.80	4.45
11.57	18	3.00	4.65
12.20	19	3.20	4.85
16.10	25	4.00	5.80

Note.—These prices cover wheels with bores as specified above. For wheels having hubs and bores larger than standard or otherwise special, additional charge will be made as shown on Page 392.

Sprocket Wheels

FOR STANDARD DETACHABLE LINK BELTING

Pitch Diameter, Inches	Number of Teeth	Price Each	
		Solid	Split
No. 67 Bore $2\frac{7}{16}$ Inches and Less			
3.89	5	$1.80	....
4.57	6	1.90	....
5.27	7	2.20	....
6.03	8	2.40	$3.95
6.68	9	2.60	4.15
7.40	10	2.80	4.35
8.18	11	2.90	4.60
8.95	12	3.10	4.80
9.54	13	3.25	4.95
10.30	14	3.40	5.10
11.08	15	3.55	5.25
11.85	16	3.70	5.65
12.48	17	3.85	5.80
13.22	18	4.00	5.95
14.04	19	4.20	6.15
14.74	20	4.40	6.35
15.44	21	4.60	6.80
16.20	22	4.80	7.00
16.94	23	5.00	7.20
17.60	24	5.20	7.40
18.38	25	5.40	7.60
19.13	26	5.60	8.05
19.90	27	5.85	8.30
20.58	28	6.10	8.55
21.32	29	6.25	8.70
22.06	30	6.50	8.95
23.57	32	7.00	9.75
24.25	33	7.25	10.00
24.94	34	7.50	10.25
25.74	35	7.75	10.50
26.45	36	8.00	11.10
27.93	38	8.60	11.70
28.68	39	8.90	12.00
29.45	40	9.20	12.30
30.16	41	9.50	13.00
30.95	42	9.80	13.30
31.59	43	10.10	13.60
32.33	44	10.40	13.90
35.35	48	11.80	15.70
35.91	49	12.20	16.10
38.09	52	13.20	17.50
39.67	54	13.90	18.20
41.05	56	14.60	19.35
44.00	60	16.50	21.25
46.88	64	18.50	23.65
54.34	74	21.10	27.10
No. 75 See No. 78			
No. 77 See No. 67			
No. 78 Bore $2\frac{15}{16}$ Inches and Less			
4.29	5	$2.40	....
5.18	6	2.60	....
5.91	7	2.80	....
6.84	8	3.00	$4.70
7.67	9	3.20	4.90

Pitch Diameter, Inches	Number of Teeth	Price Each	
		Solid	Split
No. 78 Continued			
8.48	10	$3.45	$5.15
9.27	11	3.70	5.70
10.17	12	3.95	5.95
10.94	13	4.20	6.20
11.75	14	4.50	6.50
12.62	15	4.80	6.80
13.38	16	5.20	7.65
14.11	17	5.60	8.05
15.14	18	5.80	8.25
15.78	19	6.20	8.65
16.62	20	6.60	9.05
17.47	21	6.90	9.80
18.30	22	7.30	10.20
19.17	23	7.65	10.55
20.02	24	8.00	10.90
20.79	25	8.30	11.20
21.81	26	8.60	12.00
22.50	27	8.90	12.30
23.42	28	9.20	12.60
24.17	29	9.50	12.90
24.88	30	9.80	13.20
25.80	31	9.90	13.80
26.50	32	10.10	14.00
27.40	33	10.70	14.60
28.23	34	11.10	15.00
29.10	35	11.50	15.40
30.00	36	11.90	16.30
30.83	37	12.40	16.80
31.63	38	12.90	17.30
32.42	39	13.40	17.80
33.26	40	13.90	18.30
34.93	42	14.90	19.85
35.77	43	15.40	20.35
36.60	44	15.90	20.85
38.24	46	17.10	22.60
39.90	48	18.30	23.80
40.77	49	19.00	24.50
41.65	50	19.70	25.20
43.12	52	20.50	26.55
48.24	58	24.80	31.40
49.73	60	26.00	32.60
54.01	65	28.00	35.15
64.07	77	32.80	41.60
No. 83 Bore $2\frac{15}{16}$ Inches and Less			
	All Double Teeth		
10.44	16	$4.00	$7.50
11.60	18	4.80	8.30
14.15	22	5.85	10.15
16.64	26	6.90	12.00
20.43	32	8.30	14.20
24.25	38	10.20	17.00
28.06	44	12.50	....
30.60	48	14.20	....
34.38	54	16.50	....
40.77	64	21.50	....
No. 85 Bore $2\frac{15}{16}$ Inches and Less			
7.96	6	$4.00	$6.05
9.13	7	4.50	6.55

Pitch Diameter, Inches	Number of Teeth	Price Each	
		Solid	Split
No. 85 Continued			
10.40	8	$5.00	$7.35
11.60	9	5.50	7.85
12.87	10	6.05	8.40
14.09	11	6.50	9.55
15.28	12	6.95	10.00
16.65	13	7.40	10.45
17.83	14	7.85	10.90
19.07	15	8.35	11.40
20.22	16	8.80	12.70
22.72	18	10.25	14.15
24.16	19	11.00	14.90
25.50	21	12.70	17.50
27.83	22	13.60	18.40
30.40	24	15.40	20.20
32.90	26	17.15	22.85
34.34	27	18.25	23.95
35.45	28	20.40	26.10
40.57	32	24.40	31.00
59.61	47	45.00	54.35
No. 88 See No. 78			
No. 95 See No. 85			
No. 103 Bore $3\frac{7}{16}$ Inches and Less			
5.21	5	$3.20	$5.10
6.11	6	3.60	5.50
7.03	7	4.00	5.90
7.92	8	4.40	6.60
8.93	9	4.80	7.00
9.97	10	5.25	7.45
10.82	11	5.65	8.35
11.84	12	6.05	8.75
12.86	13	6.45	9.15
13.83	14	6.85	9.55
14.82	15	7.25	9.95
15.71	16	7.65	10.95
16.61	17	8.05	11.35
17.57	18	8.45	11.75
18.58	19	8.90	12.20
19.71	20	9.40	12.70
21.54	22	10.35	14.35
22.52	23	10.80	14.80
23.42	24	11.20	15.20
24.50	25	11.75	15.75
25.35	26	12.25	16.95
26.44	27	12.75	17.45
27.35	28	13.30	18.00
28.40	29	13.85	18.55
29.14	30	14.40	19.10
30.28	31	15.20	20.60
31.45	32	16.00	21.40
32.18	33	16.80	22.20
33.20	34	17.60	23.00
34.17	35	18.40	23.80
35.11	36	19.25	25.35
36.23	37	20.25	26.35

Note.—These prices cover wheels with bores as specified above. For wheels having hubs and bores larger than standard or otherwise special, additional charge will be made as shown on Page 392.

Sprocket Wheels

FOR STANDARD DETACHABLE LINK BELTING

No. 103
Continued

Pitch Diameter, Inches	Number of Teeth	Price Each Solid	Price Each Split
37.10	38	$21.20	$27.30
38.98	40	23.10	29.20
40.20	41	23.95	30.70
40.93	42	24.80	31.55
44.89	46	28.20	35.65
46.97	48	29.90	37.35
47.90	49	30.75	38.20
53.73	55	35.85	43.95
59.42	61	40.95	50.35
64.55	66	45.50	55.55
66.52	68	60.00	70.05
79.06	81	71.05	82.45

No. 105
Bore $3\frac{7}{16}$ Inches and Less

Pitch Diameter, Inches	Number of Teeth	Price Each Solid	Price Each Split
12.15	6	$6.00	$7.90
15.88	8	7.25	9.45
19.65	10	10.60	12.80
23.45	12	11.50	14.20
25.34	13	13.00	15.70
27.34	14	15.00	17.70
31.16	16	18.20	21.50
36.95	19	24.00	27.30
48.22	25	36.00	40.00

No. 108
Bore $3\frac{7}{16}$ Inches and Less

Pitch Diameter, Inches	Number of Teeth	Price Each Solid	Price Each Split
9.41	6	$5.20	$7.40
10.90	7	5.70	7.90
12.32	8	6.20	9.20
13.86	9	7.25	10.25
15.31	10	8.10	11.10
16.70	11	9.00	12.85
18.26	12	9.90	13.75
19.63	13	10.90	14.75
21.18	14	11.80	15.65
24.16	16	14.00	19.10
27.05	18	16.25	21.35
30.06	20	18.50	23.60
36.21	24	24.00	30.40
48.26	32	37.00	46.00

No. 110
See No. 108

No. 114
Bore $3\frac{7}{16}$ Inches and Less

Pitch Diameter, Inches	Number of Teeth	Price Each Solid	Price Each Split
5.53	5	$3.00	$4.65
7.52	7	4.15	5.80
8.57	8	4.50	6.55
9.52	9	4.85	6.90
10.52	10	5.20	7.25
11.54	11	5.65	8.35
12.62	12	6.10	8.80
13.58	13	6.55	9.25
14.66	14	7.00	9.70
15.61	15	7.50	10.20
16.71	16	8.00	11.50
17.72	17	8.60	12.10
18.80	18	9.20	12.70
19.76	19	9.80	13.30
20.75	20	10.40	13.90
21.78	21	11.10	15.40
23.97	23	12.45	16.75
25.03	24	13.10	17.40
26.93	26	14.60	19.75
31.27	30	17.50	22.65
33.17	32	19.30	25.35
35.27	34	21.10	27.15
36.42	35	22.00	28.05
37.34	36	23.00	29.95
38.61	37	24.00	30.95
39.55	38	25.00	31.95
43.66	42	29.10	37.00
48.84	47	34.90	....
50.82	49	37.20	....
59.25	57	44.75	....

No. 122
Bore $3\frac{15}{16}$ Inches and Less

Pitch Diameter, Inches	Number of Teeth	Price Each Solid	Price Each Split
11.99	6	$7.65	$11.15
15.92	8	9.75	14.25
17.80	9	10.80	15.30
19.64	10	12.80	17.30
21.63	11	14.60	20.30
23.48	12	16.50	22.20
25.37	13	18.25	23.95
29.14	15	21.80	27.50
31.05	16	23.60	30.85

No. 122
Continued

Pitch Diameter, Inches	Number of Teeth	Price Each Solid	Price Each Split
37.02	19	$30.00	$37.25
40.68	21	34.00	42.80
42.83	22	36.00	44.80

No. 124
Bore $3\frac{15}{16}$ Inches and Less

Pitch Diameter, Inches	Number of Teeth	Price Each Solid	Price Each Split
8.07	6	$5.50	$7.60
10.67	8	6.20	8.90
11.88	9	6.90	9.60
13.15	10	7.70	10.40
14.43	11	8.50	12.00
15.84	12	9.40	12.90
17.08	13	10.20	13.70
18.31	14	11.00	14.50
19.57	15	12.00	15.50
20.81	16	13.00	17.40
22.17	17	14.20	18.60
23.40	18	15.20	19.60
24.64	19	16.20	20.60
26.05	20	17.30	21.70
28.56	22	19.50	24.90
29.97	23	20.60	26.00
31.18	24	21.70	27.10
32.31	25	22.80	28.20
36.27	28	26.10	32.50
39.93	30	28.50	34.90
41.29	32	30.80	38.20
43.91	34	33.00	40.40
46.60	36	35.30	43.70
49.10	38	38.00	46.40
54.34	42	43.50	52.95
59.64	46	48.80	59.25
62.15	48	52.00	62.45

No. 146
Bore $3\frac{15}{16}$ Inches and Less

Pitch Diameter, Inches	Number of Teeth	Price Each Solid	Price Each Split
16.06	8	$12.00	$16.20
18.05	9	12.65	16.85
19.93	10	13.70	17.90
24.04	12	15.70	20.70
29.82	15	18.50	23.50
35.68	18	24.00	30.00
71.20	36	45.00	....

Note.—These prices cover wheels with bores as specified above. For wheels having hubs and bores larger than standard or otherwise special, additional charge will be made as shown in table below.

BORES OF SPROCKET WHEELS

When Listed Bore is	Add to the List Price for Larger Bore as Below										
	$1\frac{15}{16}$-In.	$2\frac{7}{16}$-In.	$2\frac{15}{16}$-In.	$3\frac{7}{16}$-In.	$3\frac{15}{16}$-In.	$4\frac{7}{16}$-In.	$4\frac{15}{16}$-In.	$5\frac{7}{16}$-In.	$5\frac{15}{16}$-In.	$6\frac{7}{16}$-In.	$6\frac{15}{16}$-In.
$1\frac{7}{16}$-Inch	$0.25	$0.62	$1.12	$1.75	$2.50	.....	.....	.....	.....	.....	.....
$1\frac{11}{16}$ "	.25	.50	1.00	1.62	2.37	.....	.....	.....	.....	.....	.....
$1\frac{15}{16}$ "	.....	.37	.90	1.55	2.30	$3.12	.....	.....	.....	.....	.....
$2\frac{7}{16}$ "	.....	.....	.50	1.40	2.40	3.40	$4.50	.....	.....	.....	.....
$2\frac{15}{16}$ "	.....	.....	.....	.75	1.95	3.30	4.80	$6.30	.....	.....	.....
$3\frac{7}{16}$ "	.....	.....	.....	.....	1.05	2.70	4.40	6.30	$8.50	.....	.....
$3\frac{15}{16}$ "	.....	.....	.....	.....	.....	1.35	3.50	5.70	8.20	$10.80	$14.60
$4\frac{7}{16}$ "	.....	.....	.....	.....	.....	.....	1.50	3.80	6.30	9.00	11.00
$4\frac{15}{16}$ "	.....	.....	.....	.....	.....	.....	.....	1.80	4.70	7.80	11.20

All published wheel prices are based on hub length not exceeding twice the diameter of bore. When hubs are proportionately longer, or when bores are larger than specified above, additional charges will be made.

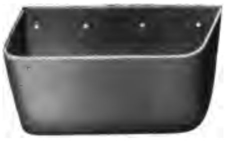


Fig. 1062

Salem Steel Elevator Buckets

These buckets are light, strong, and made entirely of steel, and are well adapted for handling smooth, finely divided loose material, such as grain, etc.

Size of Bucket		Capacity in Bushels Per Hour, 200 Feet Per Minute, 12 Inches Apart	Suitable for Ordinary Mill and Elevator Work		Suitable for Ear Corn and Similar Heavy Substances	
Length, Inches	Projection, Inches		Gauge Number	Price, Each	Gauge Number	Price, Each
2	2	21	25	$0.10	18	$0.15
2½	2¼	40	24	.10	18	.20
3	2½	59	24	.10	18	.20
3½	2½	69	24	.10	18	.23
3	3	87	23	.10	16	.29
3½	3	102	23	.10	16	.31
4	3	116	23	.15	16	.35
4½	3	131	23	.15	16	.39
4	3½	159	22	.15	16	.38
4½	3½	179	22	.15	16	.40
5	3½	199	22	.19	16	.44
5	4	229	22	.19	16	.48
5½	4	251	21	.22	16	.49
6	4	274	21	.22	16	.50
7	4½	500	20	.30	16	.56
8	5	670	19	.38	16	.63
9	5	754	19	.40	16	.75
10	5½	973	19	.48	16	.86
10	6	1220	18	.55	16	.91
11	6	1342	18	.63	16	.98
12	6	1464	18	.70	16	1.03
14	6	1708	18	.80	16	1.05
16	6	1952	18	.90	16	1.10
18	6	2196	18	1.00	16	1.15
20	6	2440	18	1.10	16	1.20
10	7	1590	18	.75	16	1.16
11	7	1749	18	.85	16	1.23
12	7	1908	18	.90	16	1.28
14	7	2226	18	.95	16	1.30
16	7	2544	18	1.33	16	1.35
18	7	2862	18	1.38	16	1.40
20	7	3180	18	1.40	16	1.45
16	8	3184	18	1.40	16	1.60
18	8	3582	18	1.50	16	1.65
20	8	3980	18	1.60	16	1.70
22	8	4378	18	1.70	16	1.80
24	8	4776	18	1.80	16	1.90

Prices on other gauges upon application.

A small additional charge will be made where buckets are furnished punched or drilled.

Malleable Iron Elevator Buckets

These buckets are cast in one piece and are carefully annealed. They are perfectly smooth and have rounded corners and bottoms, insuring free and clean delivery of material handled.

They are especially desirable for handling coarse and gritty materials, such as ore, broken stone, coal, cement, phosphate, etc.

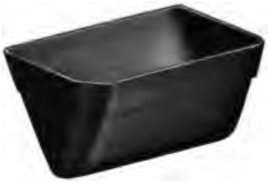
Style A—Fig. 1063

PRICE—STYLE A

Size of Bucket			Approximate Capacity			Size of Bucket			Approximate Capacity		
Length, Inches	Projection, Inches	Depth, Inches	Cubic Inches	Quarts	Price, Each	Length, Inches	Projection, Inches	Depth, Inches	Cubic Inches	Quarts	Price, Each
4	2¾	3	16	.27	$0.21	12	7	7¼	332	5.74	$1.85
5	3½	3¾	36	.62	.34	14	7	7¼	391	6.77	2.10
6	4	4¼	55	.95	.48	15	7	7¼	425	7.35	2.20
7	4½	5	85	1.47	.62	16	7	7¼	467	8.08	2.30
8	5	5½	115	1.99	.78	14	8	8½	509	8.81	2.75
10	6	6¼	204	3.53	1.20	16	8	8½	593	10.26	3.10
11	6	6¼	223	3.86	1.30	18	8	8½	668	11.56	3.50
12	6	6¼	246	4.25	1.40	18	10	10½	1053	18.23	4.75

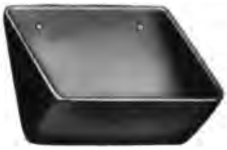
A small additional charge will be made where buckets are furnished punched or drilled.

Malleable Iron Elevator Buckets



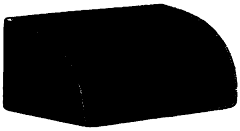
Style AA—Fig. 1064

Style AA buckets are similar in shape to Style A, but have heavy reinforced front edges and corners which increase their durability.



Style B—Fig. 1065

Style B buckets are used for handling ore, stone, coarsely broken materials, etc., in inclined elevators.



Style C—Fig. 1066

Style C buckets are especially adapted for handling clay, sugar and such materials as would stick or pack in other types of buckets.

PRICES AND LIST OF SIZES FURNISHED UPON APPLICATION.

Excelsior Elevator Bolts

FLAT HEAD

Forged from the best quality of Norway iron, and possess unusual strength. The large flat head prevents the bolt from being drawn through the belt and it is thin enough to leave a flat surface on the pulley side of the belt.

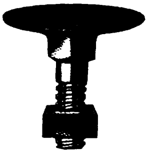


Fig. 1067

Size, Inches	Price, Per 100	Size, Inches	Price, Per 100
¼ x ¾	$2.20	5/16 x ¾	$3.00
¼ x ⅞	2.30	5/16 x 1	3.00
¼ x 1	2.30	5/16 x 1¼	3.20
¼ x 1¼	2.40	5/16 x 1½	3.40
¼ x 1½	2.50		

Eclipse Elevator Bolts

CORRUGATED AND SLOTTED HEAD

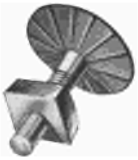


Fig. 1068

We recommend this bolt for general use. It has sharp ribs and corrugations under the head which press into the belt to prevent the bolt from turning. A slot cut into the top of the head allows the use of a screw driver to prevent the bolt from turning while the nut is being tightened.

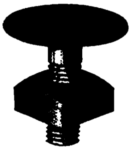


Fig. 1069

Size, Inches	Price, Per 100	Size, Inches	Price, Per 100
¼ x ½	$1.50	¼ x ¾	$1.50
¼ x ⅝	1.50	¼ x 1	1.60

Hose

Hose Brass Goods

Hose Racks

Warehouse Reels

Chemical Fire Engines

Chemical Fire Extinguishers

Tank Pumps

Cup Leathers

Pages 395 to 404 Inclusive

Water Hose

Fig. 1070

Great care has been exercised in selecting our stock of water hose, insuring a complete and graded line to meet conditions ranging from the lightest duty to that of the most severe requirements.

Internal Diameter, Inches	Price—Per Foot				
	2-Ply	3-Ply	4-Ply	5-Ply	6-Ply
½	$0.20	$0.25	$0.30	$0.37	$0.45
¾	.25	.30	.37	.46	.55
1	.33	.40	.50	.62	.75
1¼	.42	.50	.62	.77	.93
1½	.50	.60	.75	.93	1.12
2	.66	.80	1.00	1.25	1.50
2½	.83	1.00	1.25	1.56	1.87
3	.99	1.20	1.50	1.87	2.25
3½	1.15	1.40	1.75	2.18	2.62
4	1.32	1.60	2.00	2.50	3.00

Water Hose of larger sizes and more plies than listed above can be furnished on short notice.
In addition to our line of Water Hose, we carry a good assortment of Garden, Lawn and Spray Hose.

WINDING WATER HOSE WITH ROUND STEEL WIRE

Internal diameter ....inches	½	¾	1	1¼	1½	2	2½
3-Ply ....per foot	$0.03	$0.04	$0.05	$0.07	$0.08	$0.10	$0.12
4-Ply .... " "	.04	.05	.07	.08	.09	.11	.13
5-Ply .... " "	.05	.06	.08	.09	.10	.12	.14
6-Ply .... " "	.06	.07	.09	.10	.11	.13	.15

TABLE OF PRESSURES PER SQUARE INCH AT DIFFERENT ELEVATIONS WHERE THE RESERVOIR OR STANDPIPE SYSTEM IS USED

Elevation	Pressure	Elevation	Pressure	Elevation	Pressure
10 Feet	4.3 Pounds	60 Feet	26.0 Pounds	125 Feet	54.0 Pounds
20 Feet	8.7 Pounds	70 Feet	30.3 Pounds	150 Feet	65.0 Pounds
30 Feet	13.0 Pounds	80 Feet	34.6 Pounds	200 Feet	86.0 Pounds
40 Feet	17.3 Pounds	90 Feet	39.0 Pounds	250 Feet	108.0 Pounds
50 Feet	21.6 Pounds	100 Feet	43.0 Pounds	300 Feet	129.0 Pounds

Fig. 1071

Cotton Mill Hose

RUBBER LINED

Adapted for hand engines, factories, warehouses, hotels, steamships, and wherever a light, dependable hose for fire protection is required.

Internal diameter ...inches	1	1¼	1½	2	2½
Price ....per foot	$0.40	.45	.50	.65	.80

Underwriters' Unlined Linen Fire Hose

SEAMLESS

Adapted for interior fire protection in public buildings, theatres, hospitals and factories. If kept dry it can be carried on racks or reels and will last indefinitely. It is light and easily handled.

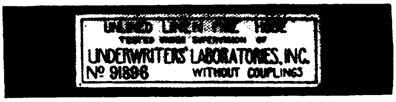


Fig. 1072

Internal diameter ....inches	1	1¼	1½	2	2½
Price ....per foot	$0.16	.18	.20	.24	.28

Every 50-foot length bears the yellow label of the Underwriters' Laboratories, Inc.
Insist upon the Underwriters' label on your hose.

Steam Hose

Adapted for steam drills, flue cleaners, and for all purposes where it is necessary to conduct steam.

PRICE LIST FOR AIR, AIR BRAKE, AIR DRILL, BREWERS', CAR HEATING, OIL, PNEUMATIC, STEAM, TANNERS' AND WINE HOSE

Internal diameter ....inches	½	¾	1	1¼	1½	2	2½
3-Ply ....per foot	$0.47	$0.57	$0.70	$0.85	$1.02	$1.34	$1.66
4-Ply .... " "	.56	.71	.87	1.04	1.25	1.66	2.08
5-Ply .... " "	.70	.87	1.07	1.30	1.56	2.07	2.60
6-Ply .... " "	.84	1.05	1.28	1.56	1.87	2.49	3.12
7-Ply .... " "	.93	1.23	1.50	1.82	2.18	2.90	3.64
8-Ply .... " "	1.12	1.41	1.70	2.08	2.50	3.32	4.16

When desired, we can wind steam hose with wire or tarred marline at a slight additional expense.

WINDING STEAM OR AIR DRILL HOSE WITH ROUND STEEL WIRE

Internal diameter ....inches	½	¾	1	1¼	1½	2	2½
3-Ply ....per foot	$0.06	$0.07	$0.08	$0.09	$0.10	$0.13	$0.17
4-Ply .... " "	.07	.08	.09	.10	.11	.14	.18
5-Ply .... " "	.08	.09	.10	.11	.12	.15	.19
6-Ply .... " "	.09	.10	.11	.12	.13	.16	.20

WINDING STEAM OR AIR DRILL HOSE WITH FLAT OR HALF-OVAL STEEL WIRE

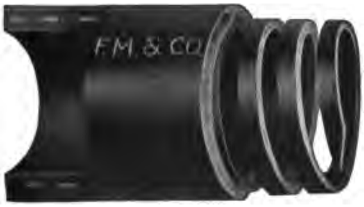
Internal diameter ....inches	½	¾	1	1¼	1½	2	2½
3-Ply ....per foot	$0.09	$0.11	$0.13	$0.15	$0.18	$0.23	$0.27
4-Ply .... " "	.10	.12	.14	.16	.19	.24	.28
5-Ply .... " "	.11	.13	.15	.17	.20	.25	.29
6-Ply .... " "	.12	.14	.16	.18	.21	.26	.30

TABLE OF PRESSURES

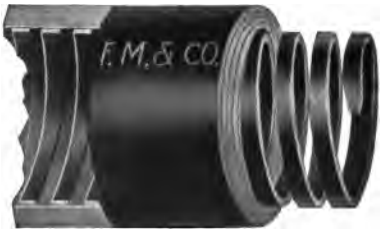
Showing steam pressure in pounds that different sizes and plies of steam hose should stand.

Internal diameter ....inches	½	¾	1	1¼	1½	2
3-Ply ....pounds	40	30	20	15	13	10
4-Ply .... "	80	60	40	30	26	20
5-Ply .... "	120	90	70	60	50	40
6-Ply .... "	160	120	100	80	65	55

Suction Hose



Smooth Bore
Fig. 1073



Rough Bore
Fig. 1074

Smooth Bore Suction Hose is made with the wire entirely concealed in the walls of the hose. This method of construction gives a perfectly smooth water-way, so much desired when pumping pulpy, sandy, and thick fluids.

The cutting effect of sand rapidly destroys the wire if exposed.

Rough Bore Suction Hose is made by first winding on the mandrel the wire, over which is laid a ply of canvas to prevent the wire from cutting or chafing the tube. The tube is next wrapped on and the hose completed by the addition of plies of frictioned canvas and the rubber cover.

Particularly adapted for pumping clear fluids.

Internal diameter ....inches	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Smooth bore ....per foot	$1.05	1.30	1.70	2.60	3.50	4.50	5.50	6.50	7.50	8.50	10.50
Rough bore.... " "	.90	1.15	1.50	2.30	3.10	4.00	4.90	5.80	6.70	7.60	9.50

Suction Hose of larger sizes than listed above can be furnished on short notice.

Brass Water Hose Couplings

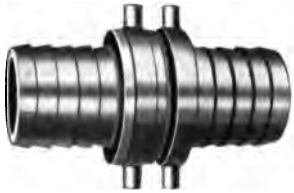


Fig. 1075

Size ....inches	½	¾	1	1¼	1½	2
Hose thread ....per dozen	$ 2.40	2.40	4.40	10.00	14.00	24.00
Iron pipe thread .... " "	2.65	2.65	4.65	10.50	15.00	26.00
Size ....inches	**2½**	**3**	**3½**	**4**	**5**	**6**
Hose thread ....per dozen	$48.00	75.00	......	......	......	......
Iron pipe thread .... " "	50.00	76.00	120.00	150.00	250.00	500.00

Note.—½, ¾ and 1-inch cast couplings have no lugs. 1¼, 1½, 2 and 2½-inch couplings have lugs on female swivel only. Couplings 3 inches and larger have lugs on both male end and female swivel.

Male Half Water Hose Couplings take half of the list of a complete set.

Female Half Water Hose Couplings take two-thirds of the list of a complete set.

Brass Steam Hose Couplings

LONG SHANK—IRON PIPE THREAD

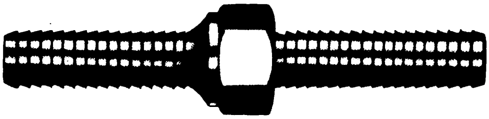


Fig. 1076

Size ....inches	½	¾	1	1¼	1½	2	2½
Iron pipe thread ....per dozen	$15.00	15.00	18.00	24.00	30.00	42.00	72.00

Male Half Steam Hose Couplings take half of the list of a complete set.

Female Half Steam Hose Couplings take two-thirds of the list of a complete set.

Expansion Ring Couplings

Made for Cotton Rubber Lined Mill Hose and Unlined Linen Fire Hose as given in table below.

Size Cotton Rubber Lined Mill Hose ....inches	1	1¼	1½	2	2½
Number of tail	7	9	11	12	13
Diameter of tail	1 5/16	1 19/32	1 27/32	2 11/32	2 7/8
Size Unlined Linen Fire Hose..inches	**1**	**1¼**	**1½**	**2**	**2½**
Number of tail	8	10	14	15	16
Diameter of tail	1 3/16	1 15/32	1¾	2 3/16	2¾

Prices upon application.

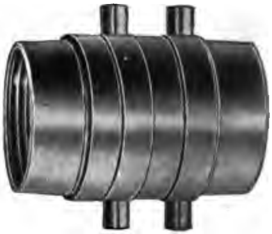


Fig. 1077

Common Hose Spanners

Size ....inches	1½	2	2½
Price....per dozen	$1.80	2.40	3.00

Fig. 1078

Brass Water Hose Clamps

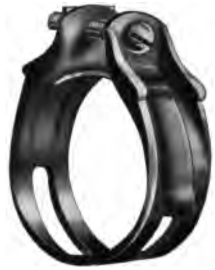


Fig. 1079

Size of hose .... inches	½	½	¾	¾	1	1	1¼
Ply of hose	3	4	3	4	3	4	3
Inside diameter (open) .... inches	$\frac{15}{16}$	$1\frac{1}{32}$	$1\frac{3}{16}$	1¼	$1\frac{7}{16}$	$1\frac{17}{32}$	$1\frac{21}{32}$
Price .... per dozen	$0.60	.60	.60	.60	2.00	2.00	2.50

Size of hose .... inches	1¼	1½	1½	2	2½	3	.....
Ply of hose	4	3	4	3 and 4	3 and 4	3 and 4	.....
Inside diameter (open) .... inches	$1\frac{13}{16}$	$1\frac{15}{16}$	$2\frac{1}{16}$	$2\frac{9}{16}$	$3\frac{1}{16}$	$3\frac{15}{16}$	.....
Price .... per dozen	$2.50	3.00	3.00	4.00	7.00	10.00	.....

Brass Steam Hose Clamps

Size of hose .... inches	¾	1	1¼	1½	2	2½
Ply of hose	4	4	4	5	5	5
Inside diameter (open) .... inches	$1\frac{17}{32}$	$1\frac{21}{32}$	$1\frac{31}{32}$	$2\frac{13}{32}$	$2\frac{7}{8}$	$3\frac{9}{16}$
Price .... per dozen	$2.00	2.50	3.00	4.00	6.50	9.50

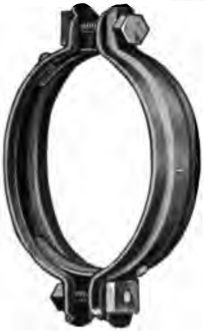


Fig. 1080

Double Bolt Brass Suction Hose Clamps

Made from extra heavy gauge sheet brass, in two pieces, with extra long tongues. Bolts have hexagon heads to use with an ordinary wrench.

Inside diameter ....inches	4	4¼	4½	4¾	5	5¼	5½
Price ....per dozen	$11.25	13.75	15.25	16.75	18.25	19.75	21.25
Inside diameter ....inches	5¾	6	6¼	6½	6¾	7	7¼
Price ....per dozen	$22.75	24.25	26.00	28.00	30.00	32.00	34.00

Vise Jaws

For use with a bench vise in applying hose clamps.

Number	Capacity	Price, Each
1	For Sizes Including 1½-inch Water Size	$0.75
2	For Sizes Including 3 -inch Water Size	.75

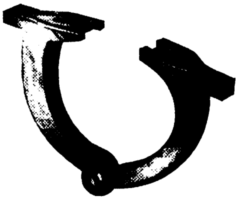
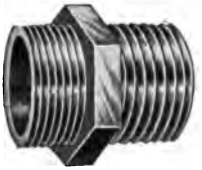
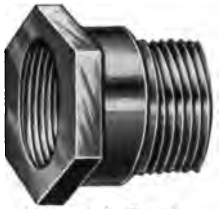


Fig. 1081

Brass Hose Nipples



Male
Fig. 1082



Male and Female
Fig. 1083

Size ....inches	½	¾	1	1¼	1½	2	2½	3
Male ....per dozen	$3.50	3.50	5.00	9.00	10.00	14.00	28.00	40.00
Male and female ....“ “	3.50	3.50	5.00	9.00	10.00	14.00	28.00	40.00

Male Hose Nipples will be sent with hose thread and iron pipe thread.

Male and Female Hose Nipples will be sent with male end, hose thread, and female end, iron pipe thread.

Brass Suction Hose Nipples

IRON PIPE THREAD

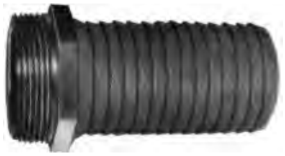
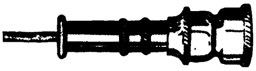


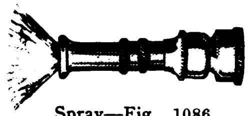
Fig. 1084

Size ....inches	2	2½	3	3½	4	5	6
Price ....each	$1.50	2.00	3.00	3.50	4.00	5.00	6.50

Gem Brass Hose Nozzles



Stream—Fig. 1085



Spray—Fig. 1086

Size ....inches	¾	1
Price ....per dozen	$10.00	15.00

Brass Hose Pipes

SCREW TIP

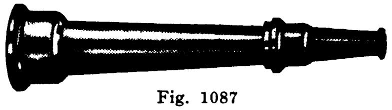


Fig. 1087

Size ....inches	¾	¾	1	1	1¼	1¼	1½	1½
Length ....inches	7½	12	8½	12½	12	15	13	15
Hose thread ....per dozen	$ 8.00	10.00	10.00	12.00	20.00	24.00	25.00	30.00
Iron pipe thread ....“ “	9.20	11.20	11.20	13.20	21.20	25.00	27.50	32.50
Size ....inches	2	2	2	2½	2½	2½	2½	2½
Length ....inches	12	15	20	15	20	24	30	36
Hose thread ....per dozen	$38.00	45.00	50.00	75.00	96.00	100.00	144.00	157.00
Iron pipe thread ....“ “	41.00	48.00	53.00	78.50	99.50	103.50	150.00	163.00

Brass Mender Tubes

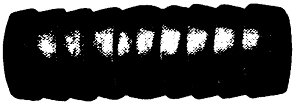


Fig. 1088

Seamless brass, will not rust in the hose. Full waterway—will not collapse.

Size ....inches	½	⅝	¾
Price ....per dozen	$1.20	1.20	1.20

Brass Hose Caps

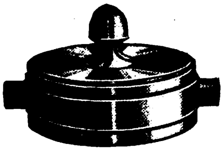


Fig. 1089

Size ....inches	¾	1	1¼	1½	2	2½	3	3½	4
Price ....per dozen	$4.00	6.00	8.00	10.00	15.00	24.00	31.00	39.00	43.00

Brass Hose Reducers

Hose thread both ends.

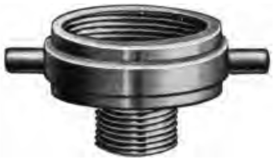


Fig. 1090

Size ....inches	1x¾	1¼x¾	1¼x1	1½x¾	1½x1	1½x1¼	2x¾	2x1	2x1¼
Price ....per dozen	$6.50	8.00	10.00	11.50	11.50	12.00	13.00	14.00	16.00
Size ....inches	2x1½	2½x¾	2½x1	2½x1¼	2½x1½	2½x2	3x2	3x2½	
Price ....per dozen	$18.00	20.00	22.00	23.00	24.00	26.00	30.00	36.00	

Brass Hose Bushings

Hose bushings will be sent with male end, iron pipe thread, and female end, hose thread.

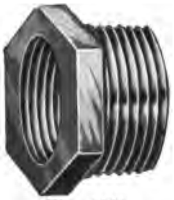
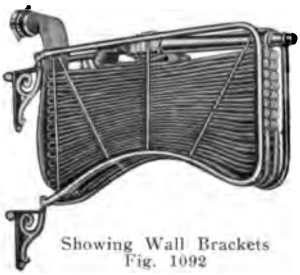


Fig. 1091

Size ....inches	1x¾	1¼x¾	1¼x1	1½x¾	1½x1	1½x1¼	2x¾	2x1	2x1¼
Price ....per dozen	$6.50	8.00	10.00	11.50	11.50	12.00	13.00	14.00	16.00
Size ....inches	2x1½	2½x¾	2½x1	2½x1¼	2½x1½	2½x2	3x2	3x2½	
Price ....per dozen	$18.00	20.00	22.00	23.00	24.00	26.00	30.00	36.00	



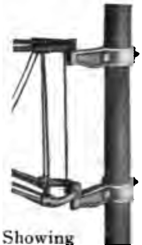
Showing Wall Brackets
Fig. 1092

Hump Swinging Hose Racks

(Patented)

There are 25 folds in a 50-foot length of hose. On a straight, flat bottom, these folds are sharp; on a "Hump" bottom, the weight is taken off the ends and they become easy folds, which will not break or crack when the hose is run off.

The end or front of the rack is partially enclosed. This prevents a sudden jerk from pulling the entire length of hose to the floor in a tangled mass.



Showing Pipe Clamps
Fig. 1093

Number	Capacity, Feet	Size Hose, Inches	Kind of Hose	Height of Rack, Inches	Length of Rack, Inches	Price, Each
*A0	50	1¼ or 1½	Unlined Linen	11	22	$5.00
*A0X	50	2	" "	11	22	5.00
*A00	50	2½	" "	11	22	5.00
A1	100	1¼ or 1½	" "	16	24	6.00
A1X	100	2	" "	16	24	6.00
A2	100	2½	" "	16	24	6.00
A3	150	1¼ or 1½	" "	23	28	7.00
A3X	150	2	" "	23	28	7.00
A4	150	2½	" "	23	28	7.00
A5	200	1¼ or 1½	" "	34	34	7.50
A5X	200	2	" "	34	34	7.50
A6	200	2½	" "	34	34	8.00
A3	50	1¼ or 1½	Cotton Rubber Lined Mill	23	28	7.00
A3X	50	2	" " " "	23	28	7.00
A4	50	2½	" " " "	23	28	7.00
A5	100	1¼ or 1½	" " " "	34	34	7.50
A5X	100	2	" " " "	34	34	7.50
A6	100	2½	" " " "	34	34	8.00

*Nos. A0, A0X and A00 can be furnished to hold 75 feet of hose at an addition of 50 cents to the prices shown above. Size, 14x22 inches.

Unless otherwise ordered, Hump Swinging Hose Racks will be furnished in red enamel finish and with wall brackets. If desired, pipe clamps can be furnished up to and including 4 inches, instead of wall brackets, at no additional expense.

We can furnish any of the above racks in gold or aluminum bronze finish at no additional expense, and in white enamel, nickel or copper plated finish at a slight additional expense, on special orders for factory shipment.

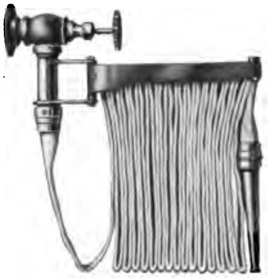


Fig. 1094

"Lightning" Hose Racks

(Patented)

The body of the rack is made from cast iron. A very neat and serviceable construction. The hose is released by pulling the nozzle, which instantly liberates all the pins, but owing to the method of construction employed in this rack the hose is not thrown to the floor in a tangled mass.

The pins remain attached to the rack.

Particularly adapted for office buildings, stores, hospitals and residences.

Where a more handsome and expensive fixture is wanted, as in banks, clubs, fine office buildings, etc., we can furnish the "Lightning" Hose Racks with valve attachment. All metal parts are nickel plated or polished brass. (Not illustrated.)

Number	Capacity, Feet	Size Hose, Inches	Kind of Hose	Finish	Price, Each
18	25 to 75	1¼, 1½, 2, 2½	Unlined Linen	Aluminum Bronze on Iron.......	$5.00
18	25 to 75	1¼, 1½, 2, 2½	" "	Red Enamel on Iron............	5.00
18	25 to 75	1¼, 1½, 2, 2½	" "	White Enamel on Iron..........	6.00
18	25 to 75	1¼, 1½, 2, 2½	" "	Nickel or Copper Plate on Iron..	7.00
19	100 to 150	1¼, 1½, 2, 2½	" "	Aluminum Bronze on Iron......	6.00
19	100 to 150	1¼, 1½, 2, 2½	" "	Red Enamel on Iron............	6.00
19	100 to 150	1¼, 1½, 2, 2½	" "	White Enamel on Iron..........	7.00
19	100 to 150	1¼, 1½, 2, 2½	" "	Nickel or Copper Plate on Iron..	8.00

Unless otherwise ordered, "Lightning" Hose Racks will be furnished in aluminum bronze or red enamel finish and with wall brackets. If desired, pipe clamps can be furnished up to and including 2½ inches, instead of wall brackets, at no additional expense.

We can furnish any of the above racks in solid brass, either polished or nickel plated finish. Prices upon application.

When ordering, state size, kind and length of hose to insure getting the proper rack for your requirements.

Warehouse Reels

STYLE D

For mills, factories, warehouses, railroads, etc. A good, strong, compact, serviceable reel.

Number of reel	41
Height of wheels..........inches	42
Extreme width over all.......... "	38
Weight of reel (bundled for shipment).......pounds	150
Capacity of 1½-inch 4-ply rubber hose..........feet	250
Capacity of 2 -inch 4-ply rubber hose.......... "	200
Capacity of 2½-inch 4-ply rubber hose.......... "	150
Capacity of 1½-inch cotton rubber lined hose.... "	500
Capacity of 2 -inch cotton rubber lined hose.... "	350
Capacity of 2½-inch cotton rubber lined hose.... "	250
Price ....each	$35.00

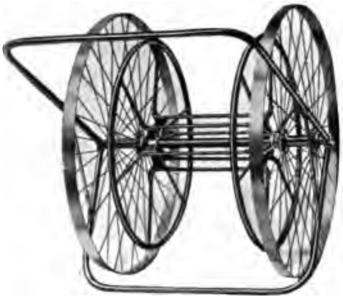


Fig. 1095

Advance Chemical Fire Engines

CAPACITY—20 GALLONS

For villages, manufactories, warehouses and large plants of all kinds.

Constructed from the best grade of heavy copper, and the inside coated with pure lead. Contains an absolutely air-tight, sealed bottle, preserving the strength of the acid, no matter how long it may have been in the bottle without use.

Can be easily moved by one man. Stands upright when in use.

Height of wheels, 30 inches.

Extreme width over all, 27 inches.

Length of hose, 50 feet, throwing a stream 65 feet.

Weight complete when charged, 352 pounds.

Price..............Each $150.00

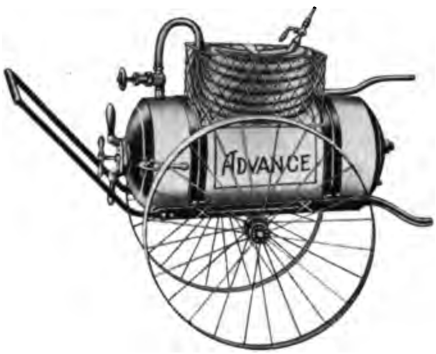


Fig. 1096

Chemical Fire Extinguishers

SIMPLE—RELIABLE—DURABLE

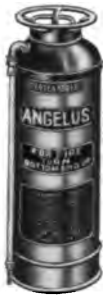


Fig. 1097

Cylinder made from special cold rolled copper with brass screw top. Extra heavy chemically treated rubber hose with solid lead nozzle. Each extinguisher is tested to 350 pounds hydrostatic pressure.

To discharge, turn extinguisher bottom end up; this allows the lead stopper to drop from the neck of the bottle and the chemicals in the bottle to flow into the larger body of chemicals in the cylinder, and immediately a stream of carbonic acid gas is thrown in dense vapor form to a distance of 50 feet, extinguishing all classes of fire instantly.

Particularly adapted for use in stores, hotels, schools, hospitals, residences, garages, warehouses, factories, laundries, etc.

Angelus—Polished copper, 3 gallon..........each	$15.00
Acme*—Polished copper, 3 gallon.......... "	18.00

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*The Acme is built from the same specifications as the Angelus, but is slightly higher in price on account of its having to bear the cost of inspection and approval by the National Board of Fire Underwriters. The Angelus is sold where an approved extinguisher is not necessary.

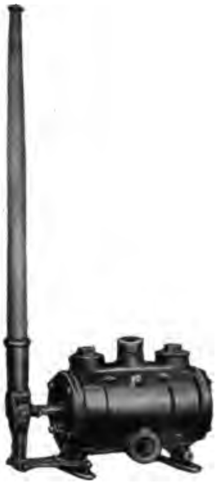


Fig. 1098

Tank Pumps

This improved tank pump is intended for use in any place where a large amount of water is required. It is fitted with a 5-inch double-acting cylinder and a 5-inch stroke, which gives it a capacity of over two barrels per minute. The metal discharge valves are accessible through hand holes closed by plugs. The check valves are accessible by removing either cylinder head. The water ways are large and direct.

Description	Weight, Pounds	Price, Each
With brass valve seats, for water, fitted for 2-inch pipe suction and 2-inch pipe discharge.	82	$18.00
With iron valve seats, for oil, fitted for 3-inch pipe suction and 3-inch pipe discharge.	82	18.00

Pump or Cup Leathers

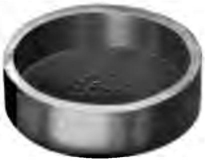


Fig. 1099

Made from firm, selected, oak tanned leather, most serviceable for deep well and artesian cylinders and a thoroughly reliable cup for hard usage.

Hydraulic and elevator cups made any size upon specifications.

Outside Diameter, Inches	Price, Per Dozen	Outside Diameter, Inches	Price, Per Dozen	Outside Diameter, Inches	Price, Per Dozen
1¾	$1.44	3¾	$3.96	6	$9.00
1⅞	1.44	3⅞	4.20	6½	10.80
2	1.44	4	4.20	6¾	12.00
2¼	1.68	4¼	4.80	7	12.00
2½	1.92	4½	5.40	7½	14.40
2¾	2.16	4¾	6.00	8	16.80
3	2.40	5	6.00	9	21.60
3¼	3.00	5½	7.20	10	26.40
3½	3.60	5¾	9.00	12	36.00

Lower Valve Leathers

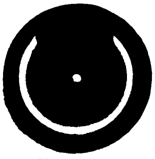


Fig. 1100

Plunger Leathers

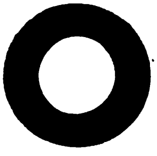


Fig. 1101

Inside diameter of cylinder.....inches	2	2¼	2½	2¾	3	3¼	3½
Outside diameter of leathers....inches	2½	2¾	3	3¼	3½	3¾	4
Lower valve leathers........per dozen	$1.20	1.20	1.20	1.20	1.20	1.20	1.20
Plunger leathers............per dozen	1.20	1.20	1.20	1.20	1.20	1.20	1.20
Inside diameter of cylinder.....inches	3¾	4	4½	5	6	....	....
Outside diameter of leathers....inches	4¼	4½	5¼	5¾	6¾	....	....
Lower valve leathers........per dozen	$1.44	1.44	2.40	3.00	6.00	....	....
Plunger leathers ....per dozen	1.44	1.44	2.40	3.00	6.00	....	....

Specify if lower valve or plunger leathers are wanted and give inside diameter of cylinder.

Valve Leather

In sides or one-half sides, per pound..Market

Packings

Asbestos Materials

Grease

Graphite

Compounds

Smooth-On Products

Waste

Metals

Melting Ladles

Pages 405 to 414 Inclusive

Packings

CLOTH INSERTION SHEET PACKING

FOR LOW PRESSURE STEAM AND WATER JOINTS

Fig. 1102

Made of a rubber compound and cotton sheeting. The cloth gives strength, the rubber elasticity and flexibility.

One ply of cloth to every 1/16 inch in thickness. Three cents per pound additional will be charged for each extra ply of cloth. The cloth, whether used as an insertion or on the outside counts as one ply. Stock rolls, 36 inches wide. Small rolls weigh about 200 pounds; large rolls weigh about 400 pounds.

	Price—Per Pound					
Thickness ....inches	1/32	1/16	3/32	1/8	3/16	1/4
1-ply	$0.65	$0.60	$0.55	....	....	....
2-ply	....	.63	.58	$0.55	....	....
3-ply	....	.66	.61	.58	$0.55	....
4-ply	....	....	....	.61	.58	$0.55

RED SHEET PACKING

FOR PACKING STEAM JOINTS

Made of a high grade red compound of rubber. It is soft and tenacious and readily conforms to any inequalities of surface. It remains soft and flexible and will not crack and blow out. It makes a perfect steam joint and, if carefully removed, may be used again and again, packing as well as when first inserted. Makes a perfect packing for hydraulic and cold joints of all kinds. It withstands the action of steam, alkalies, ammonia, etc. The application of plumbago or chalk to the face of the packing before use prevents adhesion and makes it easier to break joints after use. Stock rolls, 36 inches wide.

Carried in sizes, 1/16, 3/32, 1/8, 3/16 and 1/4-inch thick. Can be furnished any thickness on special orders.

Price ....Per pound $1.00

Fig. 1103

PETROBESTOS SHEET PACKING

WIRE INSERTED—GRAPHITED ON ONE SIDE

FOR HIGH PRESSURE STEAM JOINTS

Fig. 1104

Petrobestos Sheet Packing will meet the conditions of the highest steam pressures.

It is specially made for all gas and gasoline engines, automobile, marine and stationary service.

It is red on one side and black on the other and especially treated for the requirements of this service. Stock rolls, 39 inches wide.

Carried in sizes, 1/32 and 1/16-inch thick.

Price ....Per pound $1.50

USUDURIAN SHEET PACKING

WIRE INSERTED

FOR STEAM AND HOT WATER JOINTS

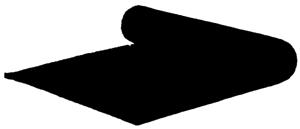


Fig. 1105

Usudurian is an unvulcanized, self-vulcanizing rubber sheet packing, made from the best possible materials. It will pack any kind of steam, hot air or hot water joints and is a non-conductor.

This packing applied in its unvulcanized state readily accommodates itself to any uneveness in the surfaces between which it is placed. In many cases joints are uneven and require building up on one side. By using this packing, any kind of a graduated joint can be made with comparatively little trouble, and without waste, as the packing can be pieced by applying a little naptha to the surface, so that under pressure it becomes as solid as one piece. When steam comes in contact with Usudurian, it becomes vulcanized and of a metallic nature. It is particularly adapted to packing steam chest covers and all super-heated steam joints and is not affected by contraction or expansion. Stock rolls, 40 inches wide.

Carried in size, 1/16-inch thick.

Price ....Per pound $1.25

Packings

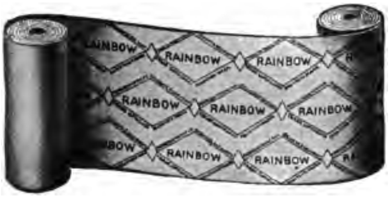


Fig. 1106

RAINBOW SHEET PACKING

Particularly adapted for very high pressures and any degree of steam heat. Not affected by oils, ammonia, alkalies, etc. Stock rolls, 36 inches wide. Rolls weigh about 200 pounds.

Carried in sizes, 1/32, 1/16, 3/32, 1/8, 3/16 and 1/4-inch thick.

Price..............Per pound $1.00

ECLIPSE SECTIONAL RAINBOW GASKETS

FOR STEAM BOILERS

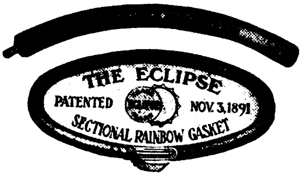


Fig. 1107

Made from Rainbow Sheet Packing Compound. A gasket for high temperature and excessive pressures. It will not harden under any degree of heat or blow out under the highest pressure, and can be taken out and repeatedly replaced.

Adapts itself readily to rough and uneven surfaces.

Carried in sizes, 3/8, 1/2, 5/8 and 3/4-inch.

Price...........Per pound $1.00

SEMIBRONZE SECTIONAL TUBULAR GASKETS

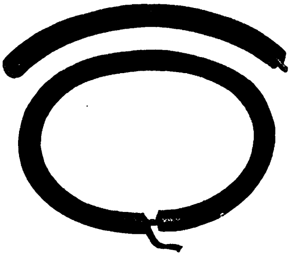


Fig. 1108

A gasket not affected by any degree of heat, acids, gases, moisture, etc., and by its construction adapts itself to rough and uneven surfaces. It is made of the best grade of asbestos metallic sheet with a metal center, making a packing of great strength and durability. It has all the advantages of the old style gaskets, combined with greater wearing and heat resisting qualities.

Carried in sizes, 3/8, 1/2, 5/8 and 3/4-inch.

Price...........Per pound $2.00

ASBESTOS METALLIC GASKETS

FOR BOILER MANHOLE AND HANDHOLE PLATES

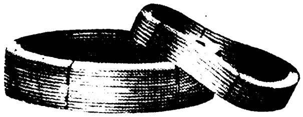


Fig. 1109

Made from long-fibre asbestos and fine brass wire. Designed for high pressures. They are heat-proof and will not blow out, no matter how high the steam pressure on the boiler may be.

We carry a stock of standard sizes and orders for special shapes should be accompanied with pattern.

Manhole Gaskets..................	Per pound $1.50
Handhole Gaskets	Per pound 2.00

PALMETTO TWIST PACKING

An ideal packing for small valve stems, such as globe valves, blow-off cocks, injectors, etc.

Does not become hard, cannot char or burn, has great tensile strength. Each strand lubricated separately with graphite compound. Can be unstranded and used for any size. On one-pound spools in individual boxes.

Carried in sizes, 1/8, 3/16 and 1/4-inch.

Price ....Per pound $1.00

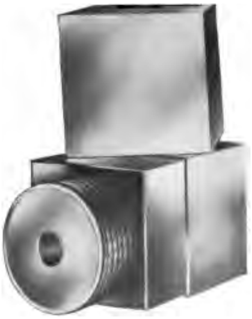


Fig. 1110

Packings

AMAZON WATERPROOF HYDRAULIC SPIRAL PACKING

Fig. 1111

This is one of our special packings, and is particularly adapted for cold water and high pressure. It is composed of long fibre flax and a special compound, which holds the fibre intact and renders "Amazon" Packing impenetrable and also self-lubricating, and capable of resisting a pressure of 3000 pounds per square inch. The rubber core gives it the elasticity required.

It is especially designed for service in waterworks, mills, railroads and elevators.

Carried in sizes, ¼, ⅜, ½, ⅝, ¾, ⅞ and 1 inch.

Price..............Per pound $1.00

COBB'S HIGH PRESSURE SPIRAL PISTON AND VALVE ROD PACKING

For rods and valve stems of marine and stationary engines, air compressors, and steam pumps. For hard service in general. It is especially adapted to withstand heat and the highest pressures. The rubber core is oil and heat-proof and will not harden. The outer covering is made of material that is not affected by heat.

Carried in sizes, ⅛, 3/16, ¼, 5/16, ⅜, 7/16, ½, ⅝, ¾, ⅞, 1 and 1⅛ inches.

Price..............Per pound $1.00

Fig. 1112

MAGIC RUBBER CUSHION DIAGONAL EXPANSION SPIRAL PACKING

Fig. 1113

This packing is especially adapted for service where rods are somewhat worn. In places where other packings must be run very tight in order to hold the steam, this packing will work perfectly with the gland head screwed up with the fingers, consequently causing very little friction. It will give the very best service for steam, hot or cold water, and ammonia.

Carried in sizes, ¼, 5/16, ⅜, 7/16, ½, 9/16, ⅝, ¾, ⅞ and 1 inch.

Price..............Per pound $1.00

GARLOCK SPIRAL PACKING

STYLE No. 15

FOR LOW PRESSURE STEAM

Made from fine quality rubber and duck and is adapted for general purposes on low pressure steam service.

Carried in sizes, 3/16, ¼, 5/16, ⅜, 7/16, ½, 9/16, ⅝, ¾, ⅞ and 1 inch.

Price..............Per pound $1.20

Fig. 1114

PILLEY'S SPIRAL PACKING

Fig. 1115

This packing is made of the very best quality of rubber and cotton duck. The lubricants used are of the best quality and are forced into the packing by a special process. Adapted for piston and valve rods on all kinds of engines and pumps.

Carried in sizes, 3/16, ¼, 5/16, ⅜, 7/16, ½, 9/16, ⅝, ¾, ⅞ and 1 inch.

Price..............Per pound $1.20

Packings

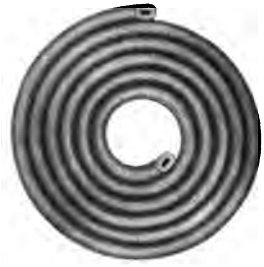


Fig. 1116

EMPIRE OVAL GUM CORE PACKING

The original gum core braided packing. Forty-two years on the market. Made from finest thread linen yarn and a core of prime quality solid para rubber. Guaranteed free from grit. Will not scratch. Prolongs the life of any piston rod.

Carried in sizes, 3/16, ¼, 5/16, ⅜, ½, 9/16, ⅝, ¾, ⅞ and 1 inch.

Price.................Per pound $0.60

DANIEL'S REGULAR P.P.P. ROD PACKING

FOR STEAM, WATER, AMMONIA, AIR, OIL, ETC.

This packing is composed of two wedges and a yielding absorbent cushion. The wedges are made of material that will stand wear, and are so shaped that they will freely slide on each other. The cushion absorbs oil that may be put on the rod, or fed to the box by other means, letting it down to the rod evenly and regularly. It is self-lubricating and will not become hard.

It is twenty to forty per cent. lighter in weight than most packings. It is impervious to the action of steam, oils, acids, alkalies and sulphurous water.

Carried in sizes, 3/16, ¼, 5/16, ⅜, 7/16, ½, 9/16, ⅝, ¾, ⅞ and 1 inch.

Price..............Per pound $1.00

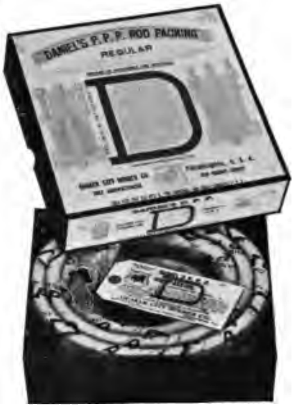


Fig. 1117

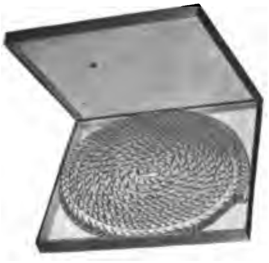


Fig. 1118

SQUARE FLAX PACKING

PLAIN OR GRAPHITED

This packing is braided square from the best quality long fibre flax roving, and is lubricated with a special compound, which, combined with the solid square braid, makes a perfect packing for water.

Carried in sizes, ¼, 5/16, ⅜, ½, ⅝, ¾, ⅞, 1, 1⅛ and 1¼ inches.

Price..............Per pound $0.80

SQUARE HYDRAULIC PACKING

A high grade packing made of the finest duck and white friction. For packing hot and cold water pumps, also for high pressure hydraulic work.

Carried in sizes, ¼, 5/16, ⅜, 7/16, ½, 9/16, ⅝, ¾, ⅞ and 1 inch.

Price..............Per pound $1.00

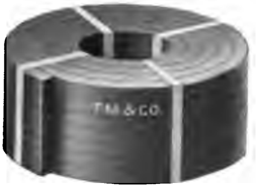


Fig. 1119

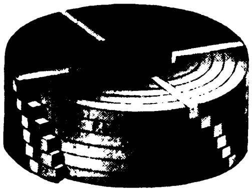


Fig. 1120

SQUARE RUBBER BACK PACKING

Made of fine grade duck with flexible rubber back.

Carried in sizes, ⅜, ½, ⅝ and ¾ inch.

Price..............Per pound $1.00

Packings

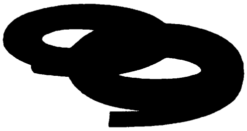


Fig. 1121

PURE GUM PACKING

ROUND AND SQUARE

Carried in sizes, ¼, ⅜, ½ and ⅝ inch.

Price.................Per pound $1.00

HEMP PACKING

IN 25 POUND COILS

American Hemp—¾-inch in diameter—"A" Grade.
Price..........................Per pound $0.20
Italian Hemp—¾-inch in diameter—"A" Grade.
Price..........................Per pound $0.25

Fig. 1122

Fig. 1123

COTTON CANDLE WICK

About 12 balls to the pound. Five pounds in a sack.

Price..........................Per pound $0.35

Asbestos Materials

KEARSARGE SHEET PACKING

FOR HIGH PRESSURE STEAM JOINTS

Made from asbestos yarn and strands of fine brass wire, firmly twisted and woven together, and coated with a rubber composition. It is flexible and very strong. It adapts itself to all uneven surfaces and makes a superior flat packing for high pressure steam. If desired, it can be furnished graphited on one or both sides. Stock rolls, 40 inches wide. Rolls weigh about 250 pounds.

Carried in sizes, 1/32, 1/16, ⅛ and ¼ inch thick.

Price......................Per pound $1.00

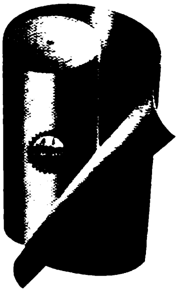


Fig. 1124

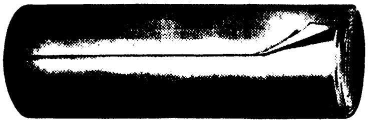


Fig. 1125

ASBESTOS PAPER

Stock rolls, 36 inches wide. Rolls weigh about 100 pounds.

Carried in sizes, 1/32, 1/16, 3/32 and ⅛ inch thick.

Price.........Per pound $0.20

ASBESTOS MILL BOARD

Asbestos mill board is fire and acid proof, and is adapted for packing joints in contact with fire, oils, etc. It is also used for fire screens, partitions, linings for ranges, stoves and grates. Furnished in sheets, 40x40 inches.

Carried in sizes, 1/32, 3/64, 1/16, 3/32, ⅛, 3/16, ¼, ⅜ and ½ inch thick.

Price.................Per pound $0.20

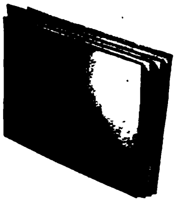


Fig. 1126

APPROXIMATE WEIGHT PER SHEET

1/32-inch thick	2 Pounds	3/16-inch thick	12 Pounds
3/64-inch thick	3 Pounds	¼-inch thick	14 Pounds
1/16-inch thick	4 Pounds	⅜-inch thick	23 Pounds
3/32-inch thick	6 Pounds	½-inch thick	27 Pounds
⅛-inch thick	8 Pounds		

Asbestos Materials

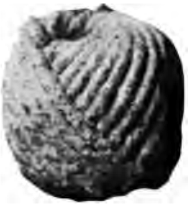


Fig. 1127

ASBESTOS WICK PACKING

This asbestos wick packing is composed of selected asbestos fibre, spun into strands, which can be separated and made into the form of a soft, strong lampwick, which may be wound or packed in any desired shape around small steam and other valve stems, pumps, etc. Being acid and fire proof, it is valuable for use in chemical works.

Furnished in ¼, ½ and 1-pound balls.

Price..........................Per pound $0.50

SECTIONAL PIPE COVERINGS

85 PER CENT. MAGNESIA SECTIONAL PIPE COVERING

FOR HIGH PRESSURE STEAM PIPES

This well-known form of high pressure pipe covering combines the high non-conducting qualities of carbonate of magnesia and asbestos in a light, highly efficient insulation. It is recommended for high pressure and superheated steam surfaces.

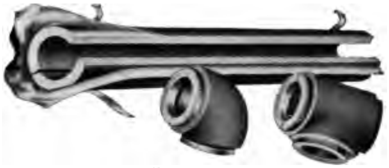


Fig. 1128

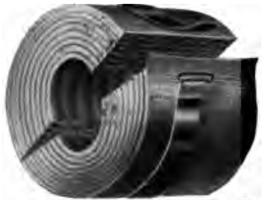


Fig. 1129

ASBESTOCEL SECTIONAL PIPE COVERING

(Patented)

FOR MEDIUM PRESSURE STEAM AND HEATING PIPES

This pipe covering is built on the arch principle, the channels running around the pipe instead of lengthwise, which prevents the circulation of air; the great objection to ordinary longitudinal air cell coverings.

It will not crush down or lose its strength, and successfully withstands vibration and hard usage.

PRICE LIST—STANDARD THICKNESSES

Inside Diameter of Pipe, Inches	Price, Per Lineal Foot	Elbows, Each	Tees, Each	Crosses, Each	Globe Valves, Each	Inside Diameter of Pipe, Inches	Price, Per Lineal Foot	Elbows, Each	Tees, Each	Crosses, Each	Globe Valves, Each
½	$0.22	$0.30	$0.36	$0.48	$0.54	4	$0.60	$0.60	$0.75	$0.95	$1.50
¾	.24	.30	.36	.48	.54	4½	.65	.72	.90	1.10	1.85
1	.27	.30	.36	.48	.54	5	.70	.90	1.20	1.50	2.25
1¼	.30	.30	.36	.48	.54	6	.80	1.30	1.60	2.00	2.80
1½	.33	.30	.36	.48	.54	7	1.00	1.80	2.20	2.80	3.60
2	.36	.36	.42	.54	.60	8	1.10	2.40	3.00	3.60	4.40
2½	.40	.42	.48	.60	.78	9	1.20	3.00	3.80	4.40	5.30
3	.45	.48	.54	.70	.96	10	1.30	3.60	4.60	5.20	6.20
3½	.50	.54	.60	.80	1.20						

All pipe coverings are furnished in sections three feet long, with canvas jacket and metal bands. Sections are split lengthwise to allow of slipping over the pipe.

ASBESTOS CEMENT AND FELTING

This form of insulation is particularly adapted for irregular surfaces and fittings where it is impossible to apply either sectional pipe covering or blocks.

Packed in bags, dry, to be mixed with water and applied by hand or with a trowel.

85 PER CENT. MAGNESIA CEMENT

A compound of carbonate of magnesia and asbestos fibres.

In 60 pound bags...........Per bag $7.50

STANDARD ASBESTOS CEMENT FELTING

A light, porous cement, partaking of the nature of a felt and cement combined.

In 120 pound bags..........Per bag $6.00

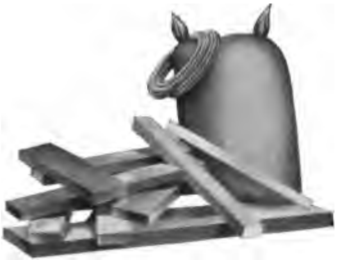


Fig. 1130

ASBESTOS BLOCKS

FOR BOILERS, HEATERS, ETC.

½-inch	Thick..........	Per	Square	Foot	$0.27	1⅜-inches	Thick..........	Per	Square	Foot	$0.42
¾-inch	"	"	"	"	.27	1½-inches	"	"	"	"	.45
⅞-inch	"	"	"	"	.30	1⅝-inches	"	"	"	"	.49
1 -inch	"	"	"	"	.30	1¾-inches	"	"	"	"	.53
1⅛-inches	"	"	"	"	.34	1⅞-inches	"	"	"	"	.57
1¼-inches	"	"	"	"	.38	2 -inches	"	"	"	"	.60

85 Per Cent. Magnesia Blocks—For high pressure steam—are furnished in blocks 3x18 inches or 6x36 inches and in all thicknesses from 1 inch up to 4 inches.

Asbestocel Blocks—For medium pressure steam—are furnished in blocks 6x36 inches and in all thicknesses from 1 inch up to 4 inches.

Asbestocel can also be furnished in sheets 3 feet square, or in blocks of special sizes.

Albany Grease

Albany Grease is a pure lubricant, does not drip, splash or waste away; self-acting, runs only while shaft is in motion. No drip pans required. It will feed perfectly through any grease cup.

Fig. 1131

No. 0—A soft grease, used in extreme cold weather on exposed journals, or in rooms of low temperature. Adapted for gears, slides, chains, elevator ways, mining and quarry machinery.

Atmospheric melting point, 50° to 60° Fahrenheit.

No. 1—A medium grease, used in cold weather on ordinary journals and slow-running journals with heavy pressure.

Atmospheric melting point, 60° to 80° Fahrenheit.

No. 2—Commonly known as winter grease in most engine rooms. Used in moderate and warm weather on shafting, loose pulleys, friction clutches, crank pins, main bearings, etc.

Atmospheric melting point, 80° to 100° Fahrenheit.

No. 3—Commonly known as summer grease. Adapted for all stationary, marine and tug-boat engines, dynamos, general electrical and high-speed machinery, motor boats and automobiles, bearings of gasoline engines, fans, blowers, steam shovels, etc.

Atmospheric melting point, 100° to 110° Fahrenheit.

No. X—A heavy-bodied, tough grease for bearings that are heavily loaded, slightly out of line, or for some reason or other run unusually warm.

Atmospheric melting point, 110° to 125° Fahrenheit.

No. XX—Has a higher melting point and will overcome lubricating difficulties beyond the reach of No. X.

Atmospheric melting point, 125° to 150° Fahrenheit.

No. XXX—Especially made for unusual conditons where temperatures surrounding the bearings are high. It has a high melting point and great lubricating values.

Atmospheric melting point, 150° to 175° Fahrenheit.

The quality of all numbers is the same, the difference being only in consistency. Carried in stock in 5-pound tin cans only, but can be furnished on special orders in 1, 10, 25 and 50-pound tin cans, kegs weighing about 125 pounds, half barrels weighing about 200 pounds, and barrels weighing about 400 pounds.

In 1-pound tin cans ....per pound	$0.25	In kegs (about 125 pounds)....per pound	$0.14
In 5, 10 and 25-pound tin cans.. " "	.20	In half barrels (about 200 pounds) " "	.13
In 50-pound tin cans .... " "	.18	In barrels (about 400 pounds).. " "	.12

Fig. 1132

Dixon's Flake Graphite

No. 632— 1-pound paper cans (36 in a case)........each	$0.25
No. 633— 5-pound tin cans, screw top (10 in a case) "	1.00
No. 634—10-pound tin cans, screw top (5 in a case) "	2.00

Dixon's Special Graphite No. 635

Specially intended for lubricating gas engine cylinders, scientific instruments, light and close fitting bearings, spindles and bobbins in textile mills, for the making of lubricants for bicycle chains and bearings. Can be used dry or mixed with water, alcohol, benzine, oil or grease, tallow or vaseline, according to requirements.

In 1-pound tin cans, 36 in a case........Each $0.40

Dixon's Graphite Pipe-Joint Compound

The modern, perfect, pipe-joint compound. In every way superior to red lead, makes better joints, does not "set." After months or years joints will yield to the tongs and render breaking unnecessary.

Invaluable to plumbers, machinists, steam and gas fitters.

No. 693— 1-pound tin cans (36 in a case)....................................each	$0.20
No. 694— 5-pound tin cans (12 in a case).. "	.90
No. 695—10-pound tin cans (6 in a case).. "	1.50

International Boiler Compound

Positively removes scaling and corrosion. Prevents the boiler from scaling in the future. Removes rust. Preserves the iron, thereby prolonging the life of the boiler. It attacks the minerals contained in the water and destroys their hardening qualities, and prevents scale from forming.

Put up in liquid, powder and brick form. In kegs weighing about 125 pounds, half barrels weighing about 225 pounds, and barrels weighing about 500 pounds.

Prices upon application.

Fig. 1133

Smooth-On Products

Fig. 1134

SMOOTH-ON IRON CEMENT—Nos. 1 AND 2

IN BLUE LABELED CANS

No. 1 is quick hardening. No. 2 is slow hardening and hydraulic.

These are chemical Iron Cements, prepared and sold in powder form, for repairing leaks or breaks in castings and for making connections in steam or hydraulic work. They withstand fire, water, steam or oil and very high pressures. Applied as a paste or putty. Must be applied to cold metal. Expansion and contraction when hard, the same as cast iron.

SMOOTH-ON ELASTIC CEMENT—No. 3

IN GREY LABELED CANS

This is an Iron Cement, prepared and sold in paste form for use on all seams of boilers or tanks, to stop leaks, for boiler patching and for screw-thread joints. Also for repairing very fine cracks. This cement is hardened by heat. Applied as a paint, paste or putty. May be applied to hot or cold metal. Expansion and contraction when hard, the same as cast iron.

SMOOTH-ON CASTINGS—No. 4

IN YELLOW LABELED CANS

This is a chemical Iron Cement for repairing blemishes, blowholes or defects in iron or steel castings, having the same color and appearance. Made in two grades. Prepared and sold in powder form. Used by foundrymen. Applied as a putty.

SMOOTH-ON JOINTS—No. 5

IN RED LABELED CANS

This is an Iron Caulking Cement for bell and spigot cast iron soil and greenhouse pipes, used in place of caulking lead and in combination with lead.

SMOOTH-ON RIVET IRON CEMENT—No. 6

IN WHITE LABELED CANS

FOR BRIDGE AND SHIP WORK

This is a Metallic Cement for making water tight joints on ships' sides, iron, steel or wood. Bridge work, construction work, metal skylights and vault lights. Withstands temperature changes and salt water. Prepared and sold in putty form.

SMOOTH-ON CORRUGATED METAL GASKETS

These Gaskets are made from sheets of specially prepared metal, rolled with concentric corrugations and then coated with one application of Smooth-On Elastic Cement. They are the best gaskets for flanged joints, for any pressure or temperature, for steam, water, fire, oil, air or ammonia.

Smooth-On Iron Cement—Nos. 1 and 2	—In 1, 5, 10 and 25-pound tin cans	........Per pound	$0.50
Smooth-On Elastic Cement—No. 3	—In 1, 5, 10 and 25-pound tin cans	.... " "	.50
Smooth-On Castings—No. 4	—In 1, 5, 10 and 25-pound tin cans	.... " "	.50
Smooth-On Joints—No. 5	—In 1, 5, 10 and 25-pound tin cans	.... " "	.50
Smooth-On Rivet Iron Cement—No. 6	—In 1, 5 and 10-pound tin cans	.... " "	.50
Smooth-On Corrugated Metal Gaskets	—1 cent per square inch surface measurement.		

Fig. 1135

Waste

FOR WIPING AND CLEANING ENGINES, MACHINERY, ETC.

WHITE COTTON

No. 1—Best Grade, per pound............................Market
No. 2—Medium Grade, per pound........................Market

COLORED COTTON

No. 1—Best Grade, per pound............................Market
No. 2—Medium Grade, per pound........................Market

COLORED WOOL

No. 1—Best Grade, per pound............................Market

IN BALES OF ABOUT 100 POUNDS.

Metals

SOLDER

Fig. 1136

Half and Half—Guaranteed half each tin and lead.
Packed 100 pounds in a box.

Babbitt Metal

GENUINE

Fig. 1137

A tin alloy of superior merit, suitable for high-speed machinery. A first-class babbitt metal for severe requirements.

COPPER HARDENED

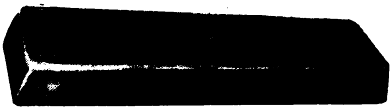


Fig. 1138

An amalgamation of pure tin, antimony and copper. Will withstand nine tons pressure per square inch without showing compression.

For heavy high-speed requirements.

DIADEM ANTI-FRICTION

Fig. 1139

Especially suitable for moderate speed and pressure machinery, sawmills, machine shops, planing mills, etc. An ideal babbitt metal for general machine work.

WE ALSO CARRY A LARGE STOCK OF BABBITT METAL NOS. 1, 2, 3 AND 4.
ALL PACKED 100 POUNDS IN A BOX.
PRICES OF METALS FURNISHED UPON APPLICATION.

Melting Ladles

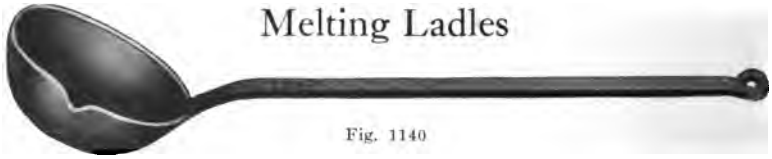


Fig. 1140

STEEL BOWL, EITHER SINGLE OR DOUBLE LIPPED
ONE PIECE WROUGHT IRON HANDLE

No. 147—LIGHT PATTERN

Diameter of Bowl	Depth of Bowl	Capacity in Lead	Price Per Dozen
2½ inches	⅞ inches	1 lb. — 2 oz.	$2.75
3 inches	1 inches	1 lb. —13 oz.	3.50
3½ inches	1⅛ inches	2 lbs.—15 oz.	4.00
4 inches	1½ inches	4 lbs.—11 oz.	4.75
5 inches	1⅞ inches	7 lbs.—11 oz.	6.50
6 inches	2¼ inches	10 lbs.— 7 oz.	8.00

No. 148—EXTRA HEAVY PATTERN

8 inches	3¼ inches	33 lbs.	$15.00

Steel Shafting
Cold Rolled Steel
Tool Steel
Drill Steel

Refined and Norway Iron
Soft and Mild Steel
Steel T Rails
Coal
Coke

Corrugated Steel Sheets
Steel Wire Nails
Wood Screws
Cap and Set Screws
Coach and Lag Screws

Machine Bolts
Common Carriage Bolts
Turnbuckles
Washers
Nuts

Pages 415 to 431 Inclusive

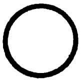


Fig. 1141

Steel Shafting

TURNED AND GROUND—HIGHLY POLISHED

This shafting is accurately straightened, round and true to size and can be run at a very high speed without heating journals.

Size, Inches	Weight Per Foot, Pounds	Price, Per Pound	Size, Inches	Weight Per Foot, Pounds	Price, Per Pound	Size, Inches	Weight Per Foot, Pounds	Price, Per Pound
$\frac{3}{16}$	.09	$0.10	$1\frac{3}{4}$	8.18	$0.05	$3\frac{7}{16}$	31.56	$0.05¼
$\frac{1}{4}$	.17		$1\frac{13}{16}$	8.77		$3\frac{1}{2}$	32.72	.05½
$\frac{5}{16}$	.26	.08½	$1\frac{7}{8}$	9.39		$3\frac{5}{8}$	35.10	
$\frac{3}{8}$	.37	.07	$1\frac{15}{16}$	10.03		$3\frac{11}{16}$	36.32	
$\frac{7}{16}$	.51		2	10.68		$3\frac{3}{4}$	37.56	
$\frac{1}{2}$	.67		$2\frac{1}{16}$	11.36		$3\frac{7}{8}$	40.12	
$\frac{9}{16}$	.84	.06	$2\frac{1}{8}$	12.06		$3\frac{15}{16}$	41.41	
$\frac{5}{8}$	1.04		$2\frac{3}{16}$	12.78		4	42.73	.06
$\frac{11}{16}$	1.26		$2\frac{1}{4}$	13.52		$4\frac{3}{16}$	46.84	
$\frac{3}{4}$	1.50	.05½	$2\frac{5}{16}$	14.28		$4\frac{1}{4}$	48.24	
$\frac{13}{16}$	1.76		$2\frac{3}{8}$	15.07		$4\frac{3}{8}$	51.12	
$\frac{7}{8}$	2.04		$2\frac{7}{16}$	15.87		$4\frac{7}{16}$	52.60	
$\frac{15}{16}$	2.35		$2\frac{1}{2}$	16.69		$4\frac{1}{2}$	54.09	.06½
1	2.67		$2\frac{9}{16}$	17.54		$4\frac{11}{16}$	58.69	
$1\frac{1}{16}$	3.01		$2\frac{5}{8}$	18.40		$4\frac{3}{4}$	60.27	
$1\frac{1}{8}$	3.38		$2\frac{11}{16}$	19.29		$4\frac{15}{16}$	65.12	
$1\frac{3}{16}$	3.77		$2\frac{3}{4}$	20.20		5	66.77	.07
$1\frac{1}{4}$	4.17		$2\frac{13}{16}$	21.13		$5\frac{3}{16}$	71.86	
$1\frac{5}{16}$	4.60		$2\frac{7}{8}$	22.08		$5\frac{1}{4}$	73.60	
$1\frac{3}{8}$	5.05		$2\frac{15}{16}$	23.05		$5\frac{7}{16}$	78.95	
$1\frac{7}{16}$	5.52		3	24.04		$5\frac{1}{2}$	80.80	.07½
$1\frac{1}{2}$	6.01	.05	$3\frac{1}{8}$	26.08	.05¼	$5\frac{11}{16}$	86.38	
$1\frac{9}{16}$	6.52		$3\frac{3}{16}$	27.14		$5\frac{3}{4}$	88.29	
$1\frac{5}{8}$	7.05		$3\frac{1}{4}$	28.21		$5\frac{15}{16}$	94.14	
$1\frac{11}{16}$	7.60		$3\frac{3}{8}$	30.42		6	96.13	.08

The above prices on sizes $\frac{3}{16}$ to $1\frac{1}{2}$ inches are for lengths from 1 to 24 feet long.
The above prices on sizes $1\frac{9}{16}$ to 6 inches are for lengths from 5 to 24 feet long.
Turned and ground steel shafting is furnished in sizes $1\frac{3}{16}$ to 6 inches in diameter. Sizes smaller than $1\frac{3}{16}$ inches in diameter are cold drawn.
We also carry a complete stock of cold rolled steel shafting.

NET EXTRAS FOR SHORT AND LONG LENGTHS

For lengths— 3 inches to $5\frac{15}{16}$ inches long	$1.00	per hundred pounds net extra
For lengths— 6 inches to $11\frac{15}{16}$ inches long	.50	" " " " "
For lengths—12 inches to $23\frac{15}{16}$ inches long	.25	" " " " "
For lengths—24 inches to $59\frac{15}{16}$ inches long	.10	" " " " "
For lengths—Over 24 feet long and less than 30 feet long	.50	" " " " "
For lengths—30 feet long and less than 35 feet long	1.00	" " " " "
For lengths—35 feet long and less than 40 feet long	1.50	" " " " "
For lengths—40 feet long and less than 45 feet long	2.00	" " " " "
For lengths—45 feet long and over	2.50	" " " " "

For lengths shorter than 3 inches special prices will be quoted.

Pump and Piston Rods

$0.50 Per Hundred Pounds Net Extra Above Same Size and Length of Shafting.

STANDARD KEYWAY DIMENSIONS

Size of Shaft, Inches	Width of Key, Inches	Depth		Size of Shaft, Inches	Width of Key, Inches	Depth	
		In Shaft, Inches	In Hub, Inches			In Shaft, Inches	In Hub, Inches
$\frac{15}{16}$ to $1\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{32}$	$\frac{5}{32}$	$3\frac{3}{16}$ to $3\frac{3}{8}$	$\frac{13}{16}$	$\frac{9}{32}$	$\frac{15}{32}$
$1\frac{3}{16}$ to $1\frac{3}{8}$	$\frac{5}{16}$	$\frac{3}{32}$	$\frac{5}{32}$	$3\frac{7}{16}$ to $3\frac{5}{8}$	$\frac{7}{8}$	$\frac{5}{16}$	$\frac{1}{2}$
$1\frac{7}{16}$ to $1\frac{5}{8}$	$\frac{3}{8}$	$\frac{1}{8}$	$\frac{3}{16}$	$3\frac{11}{16}$ to $3\frac{7}{8}$	$\frac{15}{16}$	$\frac{5}{16}$	$\frac{1}{2}$
$1\frac{11}{16}$ to $1\frac{7}{8}$	$\frac{7}{16}$	$\frac{5}{32}$	$\frac{7}{32}$	$3\frac{15}{16}$ to $4\frac{3}{8}$	1	$\frac{3}{8}$	$\frac{9}{16}$
$1\frac{15}{16}$ to $2\frac{1}{8}$	$\frac{1}{2}$	$\frac{5}{32}$	$\frac{9}{32}$	$4\frac{7}{16}$ to $4\frac{7}{8}$	$1\frac{1}{8}$	$\frac{7}{16}$	$\frac{9}{16}$
$2\frac{3}{16}$ to $2\frac{3}{8}$	$\frac{9}{16}$	$\frac{3}{16}$	$\frac{5}{16}$	$4\frac{15}{16}$ to $5\frac{3}{8}$	$1\frac{1}{4}$	$\frac{7}{16}$	$\frac{11}{16}$
$2\frac{7}{16}$ to $2\frac{5}{8}$	$\frac{5}{8}$	$\frac{7}{32}$	$\frac{11}{32}$	$5\frac{7}{16}$ to $5\frac{7}{8}$	$1\frac{3}{8}$	$\frac{15}{32}$	$\frac{25}{32}$
$2\frac{11}{16}$ to $2\frac{7}{8}$	$\frac{11}{16}$	$\frac{1}{4}$	$\frac{3}{8}$	$5\frac{15}{16}$ to 6	$1\frac{1}{2}$	$\frac{1}{2}$	$\frac{7}{8}$
$2\frac{15}{16}$ to $3\frac{1}{8}$	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{7}{16}$				

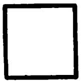


Fig. 1142

Cold Rolled Steel Squares

FOR SCREWS, NUTS, BOLTS, KEYS, SPLINES AND SQUARE SHAFTS

Size, Inches	Weight Per Foot, Pounds	Price, Per Pound	Size, Inches	Weight Per Foot, Pounds	Price, Per Pound	Size, Inches	Weight Per Foot, Pounds	Price, Per Pound
1/4	.213	$0.12	1 1/8	4.31	$0.08	2	13.61	$0.08
5/16	.332		1 3/16	4.79		2 1/16	14.46	
3/8	.479		1 1/4	5.32		2 1/8	15.35	
7/16	.652		1 5/16	5.85		2 3/16	16.27	
1/2	.850	.10	1 3/8	6.43		2 1/4	17.22	
9/16	1.08		1 7/16	7.02		2 5/16	18.19	
5/8	1.34		1 1/2	7.65		2 3/8	19.18	
11/16	1.61		1 9/16	8.30		2 7/16	20.20	
3/4	1.92	.08	1 5/8	8.98		2 1/2	21.26	
13/16	2.25		1 11/16	9.68		2 5/8	23.43	
7/8	2.60		1 3/4	10.42		2 3/4	25.72	
15/16	2.99		1 13/16	11.17		2 15/16	29.34	
1	3.40		1 7/8	11.95		3	30.61	
1 1/16	3.84		1 15/16	12.76				

The above prices are for lengths from 5 to 24 feet long.

NET EXTRAS FOR SHORT LENGTHS

For lengths— 3 inches to 5 15/16 inches long	$1.00	per	hundred	pounds	net	extra
For lengths— 6 inches to 11 15/16 inches long	.50	"	"	"	"	"
For lengths—12 inches to 23 15/16 inches long	.50	"	"	"	"	"
For lengths—24 inches to 59 15/16 inches long	.25	"	"	"	"	"

For lengths shorter than 3 inches and longer than 24 feet special prices will be quoted.

Fig. 1143

Cold Rolled Steel Hexagons

FOR SCREWS, NUTS, BOLTS, ETC.

Size, Inches	Weight Per Foot, Pounds	Price, Per Pound	Size, Inches	Weight Per Foot, Pounds	Price, Per Pound	Size, Inches	Weight Per Foot, Pounds	Price, Per Pound
1/4	.19	$0.10	13/16	1.91	$0.07 1/2	1 3/8	5.57	$0.07
5/16	.29		7/8	2.25	.07	1 7/16	6.07	
3/8	.41	.08	15/16	2.58		1 1/2	6.62	
7/16	.56		1	2.94		1 9/16	7.17	
1/2	.74		1 1/16	3.32		1 5/8	7.76	
9/16	.93	.07 1/2	1 1/8	3.73		1 11/16	8.37	
5/8	1.15		1 3/16	4.15		1 3/4	9.00	
11/16	1.40		1 1/4	4.60		1 7/8	10.32	
3/4	1.66		1 5/16	5.07				

The above prices are for lengths from 5 to 24 feet long.

NET EXTRAS FOR SHORT LENGTHS

For lengths— 3 inches to 5 15/16 inches long	$1.00	per	hundred	pounds	net	extra
For lengths— 6 inches to 11 15/16 inches long	.50	"	"	"	"	"
For lengths—12 inches to 23 15/16 inches long	.25	"	"	"	"	"
For lengths—24 inches to 59 15/16 inches long	.10	"	"	"	"	"

For lengths shorter than 3 inches and longer than 24 feet special prices will be quoted.

Fig. 1144

Cold Rolled Steel Flats

FOR FINGER BARS, KNIFE BACKS, KEYS, ENGINE GUIDES, ELEVATOR SLIDES, ETC.

Thickness, Inches	Width—Inches										
	1/2	9/16 to 23/32	3/4 to 1	1 1/16 to 1 1/2	1 9/16 to 1 3/4	1 13/16 to 2	2 1/16 to 2 1/4	2 5/16 to 2 1/2	2 9/16 to 2 3/4	2 13/16 to 3	3 1/16 to 3 1/2
3/16 to 5/16	$0.14	$0.14	$0.10	$0.10	$0.08	$0.08	....	....	....	....	....
3/8 and 7/16	.14	.14	.10	.10	.08	.08	....	....	....	....	....
1/2 and 9/16	....	.10	.08	.08	.08	.08	$0.08	$0.08	$0.08	$0.08	$0.10
5/8 and 11/16	....	.10	.08	.08	.08	.08	.08	.08	.08	.08	.10
3/4 to 15/16	....	....	.08	.08	.08	.08	.08	.08	.08	.08	.10
1 to 1 7/16	....	....	....	.08	.08	.08	.08	.08	.08	.08	.10
1 1/2 to 1 11/16	....	....	....	....	.08	.08	.08	.08	.08	.08	.10
1 3/4 to 1 15/16	....	....	....	....	....	.08	.08	.08	.08	.08	.10
2 to 2 3/16	....	....	....	....	....	....	.08	.08	.08	.08	.10
2 1/4 to 2 7/16	....	....	....	....	....	....	....	.08	.08	.08	.10
2 1/2 to 2 11/16	....	....	....	....	....	....	....	....	.08	.08	.10
2 3/4 to 2 15/16	....	....	....	....	....	....	....	....	....	.08	.10

The above prices are for lengths from 5 to 24 feet long.
For lengths shorter than 5 feet and longer than 24 feet special prices will be quoted.

Canton Tool Steel

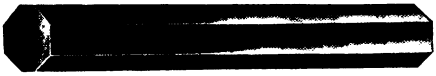


Fig. 1145

Especially adapted for making axes, edge tools, rock drills, sledges, hammers, blacksmith and track tools, granite, marble and quarry tools, and for other general purposes.

Canton Pick Steel

SAME EXTRAS AS CANTON TOOL STEEL

Tool and Pick Steel Classification

EXTRAS PER HUNDRED POUNDS

ROUND, SQUARE AND OCTAGON

5/8 TO 2 INCHES BASE

1/8	inch...... Extra,	$18.00	3/8 to 7/16	inch...... Extra,	$1.00	5 1/8 to 6	inch....... Extra,	$2.50
5/32	" ...... "	10.00	9/16 to 1/2	" ...... "	.50	6 1/8 to 7	" .... "	3.00
3/16	" ...... "	5.00	2 1/8 to 3	" ...... "	1.00	7 1/8 to 8	" .... "	3.50
1/4 to 9/32	" ...... "	3.00	3 1/8 to 4	" ...... "	1.50			
5/16 to 11/32	" ...... "	2.00	4 1/8 to 5	" ...... "	2.00			

FLAT

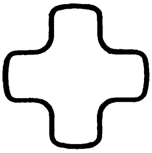
5/8 TO 2 x 3/16 TO 2 INCHES BASE

1/8 x 3/16	inch.. Extra,	$20.00	3/16 x 7 1/8 to 8	inch... Extra,	$2.00	5/8 to 2 x 2 1/8 to 7	inch. Extra,	$1.00
1/8 x 1/4	" .. "	15.00	1/4 x 5/16 & 3/8	" ... "	2.00	5/8 to 1 3/4 x 7 1/8 to 8	" . "	1.00
1/8 x 5/16	" .. "	8.00	1/4 x 7/16 to 5/8	" ... "	1.50	1 7/8 to 2 x 7 1/8 to 8	" . "	1.50
1/8 x 3/8	" .. "	4.00	1/4 x 11/16 to 2	" ... "	1.50	2 1/8 to 3 x 2 1/8 to 5	" . "	1.00
1/8 x 7/16 to 1/2	" .. "	3.00	1/4 x 2 1/8 to 7	" ... "	1.00	2 1/8 to 3 x 5 1/8 to 8	" . "	1.50
1/8 x 9/16 to 7	" .. "	2.00	1/4 x 7 1/8 to 8	" ... "	2.00	3 1/8 to 4 x 3 1/8 to 6	" . "	1.50
1/8 x 7 1/8 to 8	" .. "	3.00	5/16 x 3/8 to 5/8	" ... "	1.50	3 1/8 to 4 x 6 1/8 to 8	" . "	2.00
3/16 x 1/4	" .. "	5.00	5/16 x 11/16 to 8	" ... "	1.00	4 1/8 to 5 x 4 1/8 to 7	" . "	2.00
3/16 x 5/16	" .. "	4.00	3/8 x 7/16 to 8	" ... "	1.00	4 1/8 to 5 x 7 1/8 to 8	" . "	2.50
3/16 x 3/8	" .. "	3.00	7/16 x 1/2 to 8	" ... "	1.00	5 1/8 to 6 x 5 1/8 to 8	" . "	2.50
3/16 x 7/16 to 5/8	" .. "	2.00	1/2 x 9/16 to 8	" ... "	1.00	6 1/8 to 7 x 6 1/8 to 7	" . "	3.00
3/16 x 11/16 to 2	" .. "	1.50	9/16 x 2 1/8 to 8	" ... "	1.00	6 1/8 to 8 x 7 1/8 to 8	" . "	3.50
3/16 x 2 1/8 to 7	" .. "	1.00						

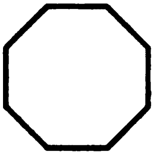
ALL DIMENSIONS INCLUSIVE—INTERMEDIATE SIZES TAKE THE NEXT HIGHER PRICE THROUGHOUT.

Canton Drill Steel

WARRANTED



Grooved
Fig. 1146



Octagon
Fig. 1147

Canton Drill Steel is a strictly hammered steel made exclusively from one brand of stock which the experience of years has demonstrated to be the best for producing the greatest combination of hardness and toughness.

CARRIED IN STOCK IN THE FOLLOWING SIZES

Grooved	7/8,	1,	1 1/8,	1 1/4,	1 3/8,	1 1/2,	1 3/4 and 2 inches
Octagon	3/4,	13/16,	7/8,	1,	1 1/8,	1 1/4,	1 3/8 and 1 1/2 inches

Refined and Norway Iron

NATIONAL CLASSIFICATION

EXTRAS PER HUNDRED POUNDS

ROUND AND SQUARE

1 to $1\frac{7}{8}$ inch	Base	
2 to $2\frac{7}{8}$ “	Extra,	$0.20
3 to $3\frac{1}{2}$ “	“	.50
$3\frac{5}{8}$ to 4 “	“	.80
$4\frac{1}{8}$ to $4\frac{1}{2}$ “	“	1.00
$4\frac{5}{8}$ to 5 “	“	1.30
$5\frac{1}{8}$ to 6 “	“	1.80
$\frac{3}{4}$ to $\frac{7}{8}$ “	“	.10
$\frac{5}{8}$ to $\frac{11}{16}$ inch	Extra,	$0.20
$\frac{1}{2}$ to $\frac{9}{16}$ “	“	.30
$\frac{7}{16}$ to $\frac{15}{32}$ “	“	.40
$\frac{3}{8}$ to $\frac{13}{32}$ “	“	.50
$\frac{5}{16}$ to $\frac{11}{32}$ “	“	.70
$\frac{1}{4}$ to $\frac{9}{32}$ “	“	.90
$\frac{7}{32}$ inch	“	1.40
$\frac{3}{16}$ “	“	2.50

FLAT

$1\frac{1}{2}$ to 4 x $\frac{3}{8}$ to 1 inch	Base	
$4\frac{1}{4}$ to 6 x $\frac{3}{8}$ to 1 “	Extra,	$0.10
$1\frac{3}{8}$ to 4 x$1\frac{1}{16}$ to $1\frac{1}{2}$ “	“	.30
$4\frac{1}{4}$ to 6 x$1\frac{1}{16}$ to $1\frac{1}{2}$ “	“	.40
$1\frac{1}{8}$ to $1\frac{3}{8}$ x $\frac{3}{8}$ to 1 “	“	.10
1 to $1\frac{1}{16}$x $\frac{3}{8}$ to $\frac{7}{8}$ “	“	.20
$\frac{3}{4}$ to $\frac{15}{16}$x$\frac{3}{8}$ to $\frac{3}{4}$ inch	Extra,	$0.40
$4\frac{1}{4}$ to 6 x$\frac{1}{4}$ to $\frac{5}{16}$ “	“	.30
$1\frac{1}{2}$ to 4 x$\frac{1}{4}$ to $\frac{5}{16}$ “	“	.20
1 to $1\frac{3}{8}$ x$\frac{1}{4}$ to $\frac{5}{16}$ “	“	.30
$\frac{3}{4}$ to $\frac{15}{16}$x$\frac{1}{4}$ to $\frac{5}{16}$ “	“	.50

REFINED IRON BANDS

$\frac{1}{8}$x $\frac{1}{2}$ inch	Extra,	$1.40
$\frac{1}{8}$x $\frac{5}{8}$ “	“	1.10
$\frac{1}{8}$x $\frac{3}{4}$ “	“	.90
$\frac{1}{8}$x $\frac{7}{8}$ “	“	.70
$\frac{1}{8}$x1 to $1\frac{3}{16}$ inches	“	.60
$\frac{1}{8}$x$1\frac{1}{4}$ to 4 “	“	.50
$\frac{1}{8}$x$4\frac{1}{4}$ to 6 “	“	.60
$\frac{3}{16}$x $\frac{1}{2}$ inch	Extra,	$1.30
$\frac{3}{16}$x $\frac{5}{8}$ “	“	1.00
$\frac{3}{16}$x $\frac{3}{4}$ “	“	.80
$\frac{3}{16}$x $\frac{7}{8}$ “	“	.60
$\frac{3}{16}$x1 to $1\frac{3}{16}$ inches	“	.50
$\frac{3}{16}$x$1\frac{1}{4}$ to 4 “	“	.40
$\frac{3}{16}$x$4\frac{1}{4}$ to 6 “	“	.50

Soft or Mild Steel

CLASSIFICATION ADOPTED OCTOBER 1st, 1909

EXTRAS PER HUNDRED POUNDS

ROUND AND SQUARE

$\frac{3}{4}$ to $3\frac{1}{16}$ inch	Base	
$\frac{5}{8}$ to $\frac{11}{16}$ “	Extra,	$0.10
$\frac{1}{2}$ to $\frac{9}{16}$ “	“	.20
$\frac{7}{16}$ inch	“	.40
$\frac{3}{8}$ “	“	.50
$\frac{5}{16}$ “	“	.70
$\frac{1}{4}$ “	“	1.00
$\frac{3}{16}$ “	“	2.50
$3\frac{1}{8}$ to $3\frac{9}{16}$ inch	Extra,	$0.15
$3\frac{5}{8}$ to $4\frac{1}{16}$ “	“	.25
$4\frac{1}{8}$ to $4\frac{9}{16}$ “	“	.30
$4\frac{5}{8}$ to 5 “	“	.40
$5\frac{1}{8}$ to $5\frac{1}{2}$ “	“	.50
$5\frac{5}{8}$ to 6 “	“	.75
$6\frac{1}{8}$ to $6\frac{1}{2}$ “	“	1.00
$6\frac{5}{8}$ to $7\frac{5}{16}$ “	“	1.25

FLAT

1 to 6 x $\frac{3}{8}$ to 1 inch	Base	
1 to 6 x $\frac{1}{4}$ to $\frac{5}{16}$ “	Extra,	$0.20
$\frac{3}{4}$ to $\frac{7}{8}$x $\frac{3}{8}$ to $\frac{3}{4}$ “	“	.40
$\frac{3}{4}$ to $\frac{7}{8}$x $\frac{1}{4}$ to $\frac{5}{16}$ “	“	.50
$1\frac{1}{8}$ to 6 x$1\frac{1}{8}$ “	“	.10
$1\frac{1}{8}$ to 6 x$1\frac{1}{4}$ to $1\frac{1}{2}$ “	“	.20
$1\frac{3}{4}$ to 6 x$1\frac{5}{8}$ to 2 “	“	.30

HALF—OVAL

$\frac{7}{8}$ to 4x$\frac{7}{32}$ to $\frac{1}{2}$ inch	Extra,	$0.50
$\frac{3}{4}$x$\frac{3}{16}$ inch	“	.80
$\frac{5}{8}$x$\frac{3}{16}$ inch	“	1.00
$\frac{1}{2}$x$\frac{1}{8}$ inch	“	1.30

HALF—ROUND

$\frac{7}{8}$ to 2 inch	Extra,	$0.50
$\frac{3}{4}$ inch	“	.80
$\frac{5}{8}$ inch	Extra,	$1.00
$\frac{1}{2}$ inch	“	1.30

Steel T Rails

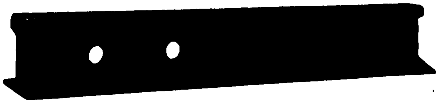


Fig. 1148

In Random Lengths 14 to 20 Feet.

Weight per yard .... pounds	8	12	16	20
Height of rail .... inches	1 5/8	2	2 3/8	2 5/8
Width of flange .... inches	1 3/8	1 7/8	2 1/4	2 1/2
Width of head .... inches	13/16	1	1 11/64	1 11/32
Feet of single track per gross ton..................	420	280	210	168
Gross tons per mile of single track..................	12.57	18.86	25.14	31.43
Size track bolt required .... inches	3/8x1 1/2	3/8x1 3/4	3/8x2	1/2x2
Size track spike required .... inches	5/16 or 3/8x2 1/2	3/8x3	3/8x3 1/2	1/2x3 1/2
Rails .... per 100 pounds	....	....	....	....
Four-hole fish plates complete with bolts......... per set	....	....	....	....

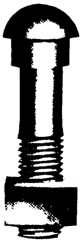


Fig. 1149

Track Bolts

WITH UNITED STATES STANDARD SQUARE NUTS

Size		Short Diameter of Nut, Inches	For Weight Rails, Per Yard	Approximate Number Per Keg of 200 Pounds	Advance Over Base, Per 100 Pounds
Diameter, Inches	Length, Inches				
3/8	1 1/2	11/16	8	1740	$3.15
3/8	1 3/4	11/16	12	1600	2.90
3/8	2	11/16	16	1480	2.65
1/2	2	7/8	20	900	1.25

Track Spikes

CHISEL POINT—HOOK HEAD

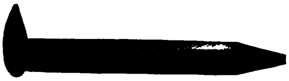


Fig. 1150

Size		For Weight Rails, Per Yard	Approximate Number Per Keg of 200 Pounds	Advance Over Base, Per 100 Pounds
Thickness of Shank, Inches	Length, Inches			
5/16	2 1/2	8 to 10	2260	$0.60
3/8	2 1/2	8 to 16	1625	.40
3/8	3	12 to 14	1400	.30
3/8	3 1/2	16 to 18	1248	.30
1/2	3 1/2	18 to 25	760	.10

Fig. 1151

Blacksmiths' Coal

Genuine George's Creek Cumberland Coal is unsurpassed for heavy forging and welding, and is particularly adapted for the use of blacksmiths, machinists, boiler-makers and all iron and steel workers.

In sacks .... Per ton, $......

Foundry Coke

In sacks .... Per ton, $......

Corrugated Steel Sheets

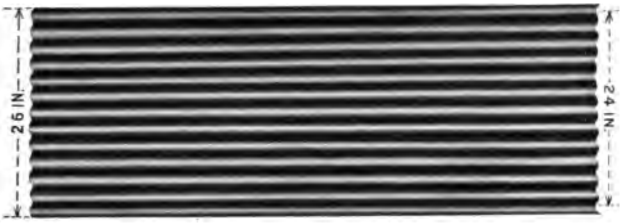


Fig. 1152

These sheets are 26 inches wide after corrugating. 2½-inch corrugations. Will lay 24 inches to the weather.

GALVANIZED

NUMBER 26 GAUGE

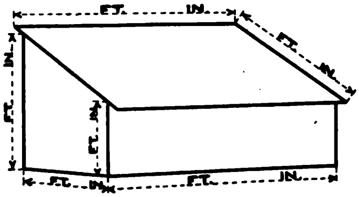
Length, Feet	Number of Square Feet, Per Sheet	Number of Sheets, Per Square	Number of Sheets, Per Bundle	Weight Per Square, Pounds
6	13.	7.692	10	98
7	15.166	6.593	10	98
8	17.333	5.770	10	98
9	19.500	5.128	10	98
10	21.666	4.616	10	98
12	26.	3.846	10	98

PAINTED

NUMBER 28 GAUGE

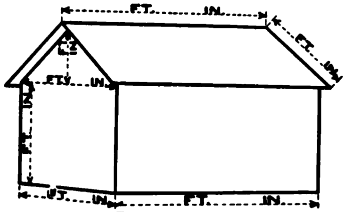
Length, Feet	Number of Square Feet, Per Sheet	Number of Sheets, Per Square	Number of Sheets, Per Bundle	Weight Per Square, Pounds
6	13.	7.692	10	68
7	15.166	6.593	10	68
8	17.333	5.770	10	68
9	19.500	5.128	10	68
10	21.666	4.616	10	68

HOW TO ORDER



For Shed Roof
Fig. 1153

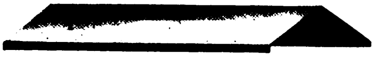
If the number and size of sheets cannot readily be determined, fill out the dimensions on a diagram similar to the sketches shown and fill out only the measurements of that part of the building you wish covered.



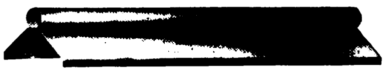
For Ridge Roof
Fig. 1154

Ridge Caps

FOR USE ON COMB OR RIDGE OF ROOF



Angle Ridge Cap
Fig. 1155



Roll Ridge Cap
Fig. 1156

Angle Ridge Cap—Galvanized, No. 26 gauge sheet steel, in 8 foot lengths....Per lineal foot $......
Angle Ridge Cap— Painted. No. 28 gauge sheet steel, in 8 foot lengths.... " " " $......
Roll Ridge Cap—Galvanized, No. 26 gauge sheet steel, 3-inch roll, in 8 foot lengths .... " " " $.....

LEAD WASHERS

These washers make an absolutely water-tight joint on corrugated or flat sheets and will prevent rust below the nail-head and the nail-head from cutting into the sheet. One pound contains about 325 washers and will put on 2 to 3 squares.

Price..........Per pound $0.50

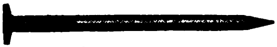
BARBED ROOFING NAILS

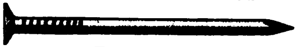
In laying corrugated or flat sheets, 2-inch No. 9 galvanized barbed roofing nails are generally used. They will average about 103 nails to the pound. It is estimated that one sheet requires about 10 nails.

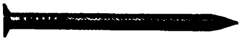
Price..........Per pound $....

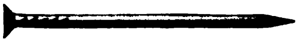
Steel Wire Nails

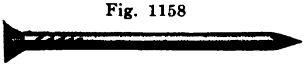
IN 100 POUND KEGS

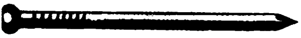

Common Nails
Fig. 1157

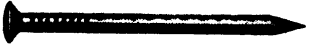

Fence Nails
Fig. 1158


Shingle Nails
Fig. 1159

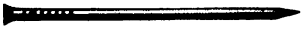

Tobacco Nails
Fig. 1160

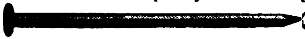

Flooring Brads
Fig. 1161

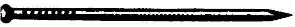

Common Brads
Fig. 1162

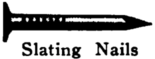

Barbed Car Nails—Heavy
Fig. 1163

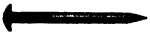
When ordering Barbed Car Nails, be sure to specify whether light or heavy, annealed or bright.

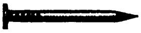

Casing Nails
Fig. 1164

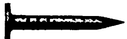

Smooth Box Nails
Fig. 1165

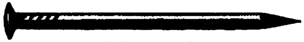

Finishing Nails
Fig. 1166


Slating Nails
Fig. 1167

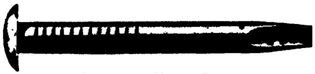

Fine Nails
Fig. 1168

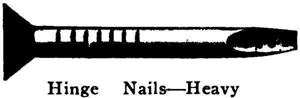

Barrel Nails
Fig. 1169

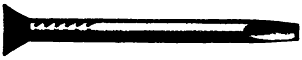

Barbed Roofing Nails
Fig. 1170


Clinch Nails
Fig. 1171

Annealed or bright. Bright clinch nails will be furnished unless otherwise ordered.

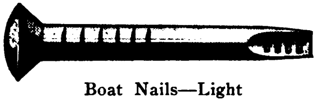

Hinge Nails—Heavy
Oval Head
Fig. 1172

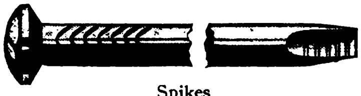

Hinge Nails—Heavy
Countersunk Head
Fig. 1173

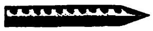

Hinge Nails—Light
Countersunk Head
Fig. 1174

Chisel or diamond point. Chisel point hinge nails will be furnished unless otherwise ordered.

When ordering hinge nails, specify whether oval or countersunk head, light or heavy, annealed or bright.


Boat Nails—Light
Fig. 1175


Spikes
Oval Head—Chisel Point
Fig. 1176


Barbed Dowel Pins
Fig. 1177

When ordering spikes, specify whether flat head, diamond point, or oval head, chisel point.

ADVANCES ON STEEL WIRE NAILS IN KEGS

ORIGINALLY ADOPTED AND EFFECTIVE DECEMBER 1st, 1896
REVISED FEBRUARY 1st, 1910
EXTRAS PER HUNDRED POUNDS

COMMON, FENCE, SHINGLE, TOBACCO, FLOORING AND COMMON BRADS

20d to 60d	Base
10d to 16d	$0.05
8d and 9d	.10
6d and 7d	.20
4d and 5d	.30
3d	.45
2d	.70

BARBED COMMON AND BARBED CAR NAILS

15 cents advance over Common.

CASING, SIDING AND SMOOTH BOX NAILS

10d and larger	$0.15
8d and 9d	.25
6d and 7d	.35
4d and 5d	.50
3d	.70
2d	1.00

Barbed Box Nails, 15 cents advance over Smooth Box Nails.

FINISHING NAILS

10d and larger	$0.25
8d and 9d	.35
6d and 7d	.45
4d and 5d	.65
3d	.85
2d	1.15

SLATING NAILS

2d	$0.80
3d	.60
4d	.40
5d	.40
6d	.30

FINE NAILS

2d, 1 x16½	$1.00
2d, 1 x17, extra fine	1.10
3d, 1⅛x15	.50
3d, 1⅛x16, extra fine	.65
4d, 1½x14	.50

BARREL NAILS

⅝-inch	$1.35
¾-inch	1.00
⅞-inch	.85
1 -inch	.70
1⅛-inch	$0.60
1¼-inch	.50
1⅜-inch	.40
1½-inch	.30

BARBED ROOFING NAILS

¾-inch	$0.75
⅞-inch	.65
1 and 1⅛-inch	.60
1¼ and 1⅜-inch	.55
1½ and 1¾-inch	.45
2 -inch	.35

CONE HEAD BARBED ROOFING NAILS

2-inch, No. 9, plain	$0.60
2-inch, No. 9, galvanized	1.60

CLINCH NAILS

(Annealed or Bright)

2d	$1.05
3d	.85
4d and 5d	.65
6d and 7d	.55
8d and 9d	.45
10d to 20d	.35

HINGE NAILS

(Annealed or Bright)

4d	$0.80
6d	.70
8d	.60
10d and larger	.50

BOAT NAILS

25 cents extra over Hinge.

SPIKES

All sizes to 9-inch	$0.10
10-inch and larger	.25

Special gauges 10 cents additional.

BARBED DOWEL PINS

⅝-inch	$1.25
¾-inch	1.00
⅞-inch	.85
1 -inch	.70
1⅛-inch	.60
1¼-inch	.60
1⅜-inch	.60
1½-inch	.60

Annealed nails (except clinch and hinge), 15 cents extra. Blued nails, 25 cents extra.
For galvanizing all standard nails (except 3d and 4d shingle), $1.00 per 100 pounds.
For galvanizing 3d and 4d shingle nails, 75 cents per 100 pounds.

Iron Wood Screws

FLAT AND ROUND HEAD

Fig. 1178

PER GROSS

Fig. 1179

List Adopted July 22nd, 1903

¼-INCH

No.	Gross
0	$0.72
1	.72
2	.72
3	.72
4	.72

⅜-INCH

No.	Gross
0	$0.72
1	.72
2	.72
3	.72
4	.72
5	.75
6	.78
7	.82
8	.88
9	.94

½-INCH

No.	Gross
1	$0.72
2	.72
3	.72
4	.75
5	.78
6	.80
7	.84
8	.90
9	.96
10	1.05
11	1.10
12	1.20

⅝-INCH

No.	Gross
1	$0.72
2	.72
3	.72
4	.75
5	.78
6	.82
7	.86
8	.92
9	.98
10	1.07
11	1.12
12	1.20
13	1.25
14	1.30

¾-INCH

No.	Gross
2	$0.72
3	.75
4	.78
5	.82
6	.85
7	.90
8	.95
9	1.00
10	1.10
11	1.15
12	1.25
13	1.35
14	1.50
16	1.80

⅞-INCH

No.	Gross
2	$0.74
3	.78
4	.82
5	.85
6	.90
7	.94
8	1.00
9	1.05
10	1.15
11	1.25
12	1.35
13	1.45
14	1.55
16	2.00

1-INCH

No.	Gross
4	$0.84
5	.87
6	.92
7	.98
8	1.05
9	1.10
10	1.20
11	1.30
12	1.40
13	1.60
14	1.70
15	2.00
16	2.50
18	2.80

1¼-INCH

No.	Gross
3	$0.88
4	.92
5	.98
6	1.05
7	1.10
8	1.15
9	1.20
10	1.30
11	1.40
12	1.55
13	1.70
14	1.90
15	2.15
16	2.50
18	3.30
20	4.00

1½-INCH

No.	Gross
3	$0.98
4	1.05
5	1.10
6	1.15
7	1.20
8	1.30
9	1.35
10	1.40
11	1.50
12	1.65
13	1.80
14	2.00
15	2.35
16	2.80
18	3.80
20	4.30

1¾-INCH

No.	Gross
5	$1.30
6	1.35
7	1.45
8	1.50
9	1.55
10	1.60
11	1.70
12	1.80
13	2.00
14	2.25
15	2.60
16	2.90
17	3.50
18	4.00
20	4.50
22	5.20

2-INCH

No.	Gross
5	$1.45
6	1.50
7	1.55
8	1.60
9	1.65
10	1.75
11	1.85
12	2.00
13	2.20
14	2.45
15	2.75
16	3.10
17	3.70
18	4.20
20	4.80
22	5.50

2¼-INCH

No.	Gross
5	$1.55
6	1.60
7	1.65
8	1.75
9	1.85
10	1.95
11	2.05
12	2.20
13	2.35
14	2.65
15	3.10
16	3.50
17	3.85
18	4.55
20	5.30
22	6.10

2½-INCH

No.	Gross
5	$1.90
6	2.00
7	2.10
8	2.20
9	2.30
10	2.40
11	2.50
12	2.60
13	2.70
14	2.90
15	3.30
16	3.65
17	4.20
18	4.70
20	5.80
22	6.70

2¾-INCH

No.	Gross
6	$2.40
7	2.60
8	2.70
9	2.80
10	2.90
11	3.00
12	3.10
13	3.20
14	3.30
15	3.60
16	3.90
17	4.50
18	5.00
20	6.10
22	7.20
24	8.50

3-INCH

No.	Gross
8	$3.05
9	3.10
10	3.15
11	3.20
12	3.30
13	3.40
14	3.50
15	3.80
16	4.20
18	5.50
20	6.50
22	7.50
24	8.70
26	10.50

3½-INCH

No.	Gross
8	$3.90
9	4.00
10	4.10
11	4.20
12	4.30
13	4.40
14	4.50
15	4.75
16	4.95
18	6.15
20	7.30
22	8.70
24	10.20
26	12.00

4-INCH

No.	Gross
10	$5.20
11	5.30
12	5.40
13	5.60
14	5.90
15	6.20
16	6.50
18	7.60
20	8.60
22	9.70
24	11.20
26	14.00
28	16.00
30	18.50

4½-INCH

No.	Gross
12	$7.00
13	7.20
14	7.60
15	7.85
16	8.15
17	8.60
18	9.15
20	9.85
22	11.20
24	13.50
26	16.00
28	18.50
30	21.50

5-INCH

No.	Gross
12	$8.10
13	8.30
14	8.60
15	9.10
16	9.70
17	10.10
18	11.00
20	11.50
22	13.00
24	15.00
26	18.00
28	21.00
30	24.00

6-INCH

No.	Gross
12	$10.00
13	10.30
14	11.00
15	11.60
16	12.40
17	13.00
18	14.50
20	16.00
22	18.00
24	20.00
26	23.00
28	27.00
30	30.50

One gross in a box. ¼ to 1¾ inches, smaller than No. 17, 10 gross, larger sizes 5 gross in a package.

Cap Screws

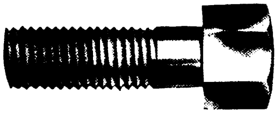


Fig. 1180

HEXAGON HEAD—"V" THREAD EXACT
PER HUNDRED

	Diameter of screw ......inch	¼	5/16	⅜	7/16	½	9/16	⅝	¾	⅞	1
	Diameter of head .... "	7/16	½	9/16	⅝	¾	13/16	⅞	1	1⅛	1¼
	Length of head.......... "	¼	5/16	⅜	7/16	½	9/16	⅝	¾	⅞	1
	Threads per inch............	20	18	16	14	12	12	11	10	9	8
Length Under Head to Extreme Point, Inches	½	$3.00	$3.25	$3.75	$4.50	.....	.....	.....	.....	.....	.....
	¾	3.00	3.25	3.75	4.50	$5.70	.....	.....	.....	.....	.....
	⅞	3.15	3.40	3.90	4.70	5.80	.....	.....	.....	.....	.....
	1	3.25	3.50	4.00	4.90	5.90	$9.25	$9.25	$12.50	.....	.....
	1¼	3.50	3.75	4.25	5.30	6.50	9.50	9.50	12.50	$18.40	.....
	1½	3.75	4.00	4.50	5.70	7.10	10.00	10.00	13.50	18.40	$22.75
	1¾	4.00	4.25	4.85	6.10	7.70	10.75	10.75	14.50	19.70	22.75
	2	4.25	4.85	5.20	6.50	8.30	11.50	11.50	15.50	21.00	25.00
	2¼	4.70	5.35	5.55	7.15	8.90	12.60	12.60	16.50	22.40	27.25
	2½	5.25	5.80	6.00	7.50	9.50	13.60	13.60	17.50	23.70	29.50
	2¾	5.75	6.30	6.65	7.90	10.10	14.40	14.40	19.00	25.00	31.75
	3	6.25	6.80	7.20	8.40	10.70	15.20	15.20	20.60	26.40	34.00
	3¼	.....	.....	.....	9.15	11.50	16.00	16.00	22.10	28.20	36.25
	3½	.....	.....	.....	9.75	12.30	17.30	17.30	23.70	30.00	38.50
	3¾	.....	.....	.....	10.50	13.10	18.60	18.60	25.30	31.80	40.75
	4	.....	.....	.....	11.10	13.90	19.90	19.90	26.90	33.60	43.00
	4¼	.....	.....	.....	.....	.....	.....	21.20	28.50	35.40	45.25
	4½	.....	.....	.....	.....	.....	.....	22.50	30.10	37.20	47.50
	4¾	.....	.....	.....	.....	.....	.....	.....	31.70	39.00	49.75
	5	.....	.....	.....	.....	.....	.....	.....	.....	40.80	52.00
	Add for each ¼ inch longer...	$0.40	.50	.60	.70	.80	1.30	1.30	1.60	1.80	2.25

Set Screws

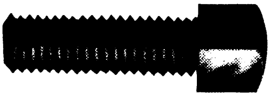


Fig. 1181

SQUARE HEAD—CASE HARDENED—"V" THREAD EXACT
CUP POINT
PER HUNDRED

	Diameter of screw.......inch	¼	5/16	⅜	7/16	½	9/16	⅝	¾	⅞	1
	Threads per inch............	20	18	16	14	12	12	11	10	9	8
Length Under Head to Extreme Point, Inches	½	$1.80	$2.00	$2.35	.....	.....	.....	.....	.....	.....	.....
	⅝	1.90	2.10	2.45	$2.80	$3.30	.....	.....	.....	.....	.....
	¾	2.00	2.20	2.50	2.90	3.40	$5.00	$5.00	.....	.....	.....
	⅞	2.10	2.30	2.60	3.00	3.60	5.50	5.50	.....	.....	.....
	1	2.15	2.35	2.65	3.10	3.80	5.75	5.75	$10.00	.....	.....
	1¼	2.30	2.50	2.85	3.50	4.30	6.50	6.50	11.00	$15.50	.....
	1½	2.50	2.70	3.10	4.00	4.80	7.25	7.25	12.00	16.20	$22.00
	1¾	2.75	3.00	3.50	4.50	5.40	8.00	8.00	12.80	17.70	24.00
	2	3.25	3.50	4.00	5.15	6.00	8.80	8.80	13.60	19.20	26.00
	2¼	3.75	4.00	4.50	5.75	6.75	9.60	9.60	14.50	20.70	28.00
	2½	4.25	4.50	5.00	6.35	7.50	10.40	10.40	15.40	22.20	30.00
	2¾	4.75	5.00	5.50	6.75	8.25	11.20	11.20	16.30	23.70	32.00
	3	5.25	5.50	6.00	7.20	9.00	12.00	12.00	17.30	25.20	34.00
	3¼	.....	.....	.....	7.60	9.75	12.75	12.75	18.40	26.70	36.00
	3½	.....	.....	.....	8.00	10.50	13.50	13.50	19.50	28.20	38.00
	3¾	.....	.....	.....	8.50	11.25	14.30	14.30	20.75	29.70	40.00
	4	.....	.....	.....	9.00	12.00	15.10	15.10	22.00	31.20	42.00
	4¼	.....	.....	.....	.....	.....	.....	15.90	23.50	32.70	44.00
	4½	.....	.....	.....	.....	.....	.....	16.70	25.00	34.20	46.00
	4¾	.....	.....	.....	.....	.....	.....	.....	26.50	35.70	48.00
	5	.....	.....	.....	.....	.....	.....	.....	.....	37.20	50.00
	Add for each ¼ inch longer...	$0.50	.60	.70	.80	.90	1.10	1.10	1.50	1.70	2.25

Coach and Lag Screws

GIMLET POINT—SQUARE HEAD

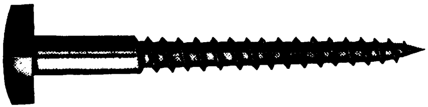


Fig. 1182

PER HUNDRED

List Adopted November 12th, 1908

Length, Inches	Diameter—Inches							
	5/16	3/8	7/16	½	9/16 and 5/8	¾	7/8	1
1½	$2.25	$2.70	$3.15	$3.75	.....	.....	.....	.....
2	2.45	2.96	3.47	4.11	$6.00	.....	.....	.....
2½	2.65	3.22	3.79	4.47	6.50	$9.20	.....	.....
3	2.85	3.48	4.11	4.83	7.00	9.90	$15.00	.....
3½	3.05	3.74	4.43	5.19	7.50	10.60	16.00	$22.00
4	3.25	4.00	4.75	5.55	8.00	11.30	17.00	23.30
4½	3.45	4.26	5.07	5.91	8.50	12.00	18.00	24.60
5	3.65	4.52	5.39	6.27	9.00	12.70	19.00	25.90
5½	3.85	4.78	5.71	6.63	9.50	13.40	20.00	27.20
6	4.05	5.04	6.03	6.99	10.00	14.10	21.00	28.50
6½	.....	.....	6.35	7.35	10.50	14.80	22.00	29.80
7	.....	.....	6.67	7.71	11.00	15.50	23.00	31.10
7½	.....	.....	6.99	8.07	11.50	16.20	24.00	32.40
8	.....	.....	7.31	8.43	12.00	16.90	25.00	33.70
9	.....	.....	7.95	9.15	13.00	18.30	27.00	36.30
10	.....	.....	.....	9.87	14.00	19.70	29.00	38.90
11	.....	.....	.....	10.59	15.00	21.10	31.00	41.50
12	.....	.....	.....	11.31	16.00	22.50	33.00	44.10

The following extras are to be understood as a part of this list.

Hexagon Heads, 10 per cent. extra. Tee Heads, 20 per cent. extra.

AVERAGE WEIGHT PER HUNDRED OF COACH AND LAG SCREWS

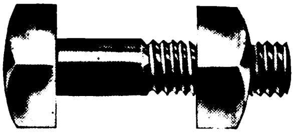
POUNDS

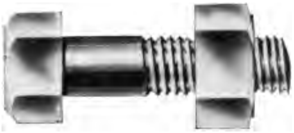
Length, Inches	Diameter—Inches							
	5/16	3/8	7/16	½	5/8	¾	7/8	1
1½	3.8	5.4	8.4	11.4				
2	4.7	6.6	10.2	13.8	22.2			
2½	5.6	7.9	11.9	16.1	26.0	41.0		
3	6.5	9.1	13.6	18.4	29.8	46.5	64.8	
3½	7.4	10.4	15.4	20.8	33.7	52.0	72.5	103.
4	8.3	11.6	17.1	23.1	37.5	57.5	80.2	113.
4½	9.2	12.9	18.9	25.5	41.4	63.0	87.9	123.
5	10.1	14.1	20.6	27.8	45.2	68.5	95.6	133.
5½	11.0	15.4	22.4	30.2	49.1	74.0	103.3	143.
6	11.9	16.6	24.1	32.5	52.9	79.5	111.0	153.
7	13.7	19.1	27.6	37.2	60.6	90.5	126.4	173.
8	15.5	21.6	31.1	41.9	68.3	101.5	141.8	193.
9	17.3	24.1	34.6	46.6	76.0	112.5	157.2	213.
10	19.1	26.6	38.1	51.3	83.7	123.5	172.6	233.
11	20.9	29.1	41.6	56.0	91.4	134.5	188.0	253.
12	22.7	31.6	45.1	60.7	99.1	145.5	203.4	273.

Machine Bolts

WITH SQUARE HEADS, SQUARE NUTS AND FINISHED POINTS

UNITED STATES STANDARD THREADS


Square Head and Nut
Fig. 1183


Hexagon Head and Nut
Fig. 1184

PER HUNDRED

List Adopted August 1st, 1912

Length, Inches	Diameter—Inches										
	1/4	5/16	3/8	7/16	1/2	9/16 & 5/8	3/4	7/8	1	1 1/8	1 1/4
3/4 to 1 1/2	$ 1.70	$ 2.00	$ 2.40	$ 2.80	$ 3.60	$ 5.20	$ 7.70	$10.50	$15.10	$22.50	$30.00
2	1.78	2.12	2.56	3.00	3.86	5.58	8.25	11.20	16.00	23.70	31.50
2 1/2	1.86	2.24	2.72	3.20	4.12	5.96	8.80	11.90	16.90	24.90	33.00
3	1.94	2.36	2.88	3.40	4.38	6.34	9.35	12.60	17.80	26.10	34.50
3 1/2	2.02	2.48	3.04	3.60	4.64	6.72	9.90	13.30	18.70	27.30	36.00
4	2.10	2.60	3.20	3.80	4.90	7.10	10.45	14.00	19.60	28.50	37.50
4 1/2	2.18	2.72	3.36	4.00	5.16	7.48	11.00	14.70	20.50	29.70	39.00
5	2.26	2.84	3.52	4.20	5.42	7.86	11.55	15.40	21.40	30.90	40.50
5 1/2	2.34	2.96	3.68	4.40	5.68	8.24	12.10	16.10	22.30	32.10	42.00
6	2.42	3.08	3.84	4.60	5.94	8.62	12.65	16.80	23.20	33.30	43.50
6 1/2	2.50	3.20	4.00	4.80	6.20	9.00	13.20	17.50	24.10	34.50	45.00
7	2.58	3.32	4.16	5.00	6.46	9.38	13.75	18.20	25.00	35.70	46.50
7 1/2	2.66	3.44	4.32	5.20	6.72	9.76	14.30	18.90	25.90	36.90	48.00
8	2.74	3.56	4.48	5.40	6.98	10.14	14.85	19.60	26.80	38.10	49.50
9	2.90	3.80	4.80	5.80	7.50	10.90	15.95	21.00	28.60	40.50	52.50
10	3.06	4.04	5.12	6.20	8.02	11.66	17.05	22.40	30.40	42.90	55.50
11	3.22	4.28	5.44	6.60	8.54	12.42	18.15	23.80	32.20	45.30	58.50
12	3.38	4.52	5.76	7.00	9.06	13.18	19.25	25.20	34.00	47.70	61.50
13	3.54	4.76	6.08	7.40	9.58	13.94	20.35	26.60	35.80	50.10	64.50
14	3.70	5.00	6.40	7.80	10.10	14.70	21.45	28.00	37.60	52.50	67.50
15	3.86	5.24	6.72	8.20	10.62	15.46	22.55	29.40	39.40	54.90	70.50
16	4.02	5.48	7.04	8.60	11.14	16.22	23.65	30.80	41.20	57.30	73.50
17	4.18	5.72	7.36	9.00	11.66	16.98	24.75	32.20	43.00	59.70	76.50
18	4.34	5.96	7.68	9.40	12.18	17.74	25.85	33.60	44.80	62.10	79.50
19	4.50	6.20	8.00	9.80	12.70	18.50	26.95	35.00	46.60	64.50	82.50
20	4.66	6.44	8.32	10.20	13.22	19.26	28.05	36.40	48.40	66.90	85.50
21	......	......	......	......	13.74	20.02	29.15	37.80	50.20	69.30	88.50
22	......	......	......	......	14.26	20.78	30.25	39.20	52.00	71.70	91.50
23	......	......	......	......	14.78	21.54	31.35	40.60	53.80	74.10	94.50
24	......	......	......	......	15.30	22.30	32.45	42.00	55.60	76.50	97.50
25	......	......	......	......	15.82	23.06	33.55	43.40	57.40	78.90	100.50
26	......	......	......	......	......	......	34.65	44.80	59.20	81.30	103.50
27	......	......	......	......	......	......	35.75	46.20	61.00	83.70	106.50
28	......	......	......	......	......	......	36.85	47.60	62.80	86.10	109.50
29	......	......	......	......	......	......	37.95	49.00	64.60	88.50	112.50
30	......	......	......	......	......	......	39.05	50.40	66.40	90.90	115.50

The following extras are to be understood as a part of this list.
Bolts with Hexagon Heads, 10 per cent. extra.
Bolts with Hexagon Nuts, 10 per cent. extra.
Bolts with Hexagon Heads and Hexagon Nuts, 20 per cent. extra.
Joint Bolts with Oblong Nuts, 10 per cent. extra.
Bolts with Tee Heads, Askew Heads and Eccentric Heads, 20 per cent. extra.
Key Bolts, 20 per cent. extra.
Bolts with Cotter Holes, 25 per cent. extra.
Bolts with U. S. Standard Square Nuts, 5 per cent. extra.
Bolts with U. S. Standard Hexagon Nuts, 15 per cent. extra.
Bolts packed other than standard packages to be charged extra at discretion of manufacturer.

FOR WEIGHTS, SEE PAGE 428.

Common Carriage Bolts

WITH SHORT FULL SIZE SQUARE UNDER HEADS, FORGED NUTS AND FINISHED POINTS
UNITED STATES STANDARD THREADS

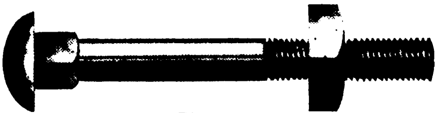


Fig. 1185
PER HUNDRED
List Adopted November 1st, 1912

Length, Inches	Diameter—Inches						
	1/4	5/16	3/8	7/16	1/2	9/16 and 5/8	3/4
1½	$1.00	$1.40	$1.90	$2.20	....	....	....
2	1.10	1.52	2.06	2.40	....	....	....
2½	1.20	1.64	2.22	2.60	$3.25	$5.75	$8.50
3	1.30	1.76	2.38	2.80	3.53	6.13	9.00
3½	1.40	1.88	2.54	3.00	3.81	6.51	9.50
4	1.50	2.00	2.70	3.20	4.09	6.89	10.00
4½	1.60	2.12	2.86	3.40	4.37	7.27	10.50
5	1.70	2.24	3.02	3.60	4.65	7.65	11.00
5½	1.80	2.36	3.18	3.80	4.93	8.03	11.50
6	1.90	2.48	3.34	4.00	5.21	8.41	12.00
6½	2.00	2.60	3.50	4.20	5.49	8.79	12.50
7	2.10	2.72	3.66	4.40	5.77	9.17	13.00
7½	2.20	2.84	3.82	4.60	6.05	9.55	13.50
8	2.30	2.96	3.98	4.80	6.33	9.93	14.00
8½	2.40	3.08	4.14	5.00	6.61	10.31	14.50
9	2.50	3.20	4.30	5.20	6.89	10.69	15.00
9½	2.60	3.32	4.46	5.40	7.17	11.07	15.50
10	2.70	3.44	4.62	5.60	7.45	11.45	16.00
11	2.90	3.68	4.94	6.00	8.01	12.21	17.00
12	3.10	3.92	5.26	6.40	8.57	12.97	18.00
13	3.30	4.16	5.58	6.80	9.13	13.73	19.00
14	3.50	4.40	5.90	7.20	9.69	14.49	20.00
15	3.70	4.64	6.22	7.60	10.25	15.25	21.00
16	3.90	4.88	6.54	8.00	10.81	16.01	22.00
17	4.10	5.12	6.86	8.40	11.37	16.77	23.00
18	4.30	5.36	7.18	8.80	11.93	17.53	24.00
19	4.50	5.60	7.50	9.20	12.49	18.29	25.00
20	4.70	5.84	7.82	9.60	13.05	19.05	26.00

Bolts with Hexagon Nuts, 15 per cent. extra.
Intermediate lengths take next higher list.
Larger diameters take Machine Bolt List.

FOR WEIGHTS, SEE PAGE 428.

Pressed Wrought Iron Turnbuckles

WITH RIGHT AND LEFT STUB ENDS
UNITED STATES STANDARD THREADS

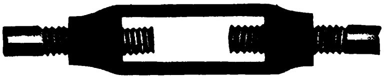


Fig. 1186
SIX INCHES BETWEEN HEADS

Diameter of Stub Ends, Inches	Outside Length of Buckle, Inches	Length of Stub Ends, Inches	Price, Each	Diameter of Stub Ends, Inches	Outside Length of Buckle, Inches	Length of Stub Ends, Inches	Price, Each
3/8	7⅛	8	$0.40	1¼	9¾	10	$1.25
1/2	7½	8	.45	1⅜	10⅛	10½	1.38
5/8	7⅞	8	.50	1½	10½	10½	1.50
3/4	8¼	8½	.63	1⅝	10⅞	11	1.75
7/8	8⅝	9	.75	1¾	11¼	11	2.00
1	9	9½	.88	1⅞	11⅝	11½	2.25
1⅛	9⅜	9½	1.00	2	12	11½	2.65

Longer turnbuckles can be furnished to order. Prices upon application.

Average Weight Per Hundred of Machine Bolts

WITH SQUARE HEADS AND SQUARE NUTS

POUNDS

Length, Inches	Diameter—Inches									
	¼	5/16	⅜	7/16	½	9/16	⅝	¾	⅞	1
1½	3.1	5.6	8.8	13.5	18.5	25.8	33.4	53.8	88.0	130.0
2	3.7	6.5	10.2	15.4	21.0	29.2	37.5	59.7	96.2	140.8
2½	4.4	7.5	11.7	17.4	23.6	32.7	41.6	65.7	104.4	151.6
3	5.0	8.4	13.1	19.3	26.1	36.1	45.7	71.6	112.6	162.4
3½	5.7	9.4	14.6	21.3	28.7	39.6	49.8	77.6	120.8	173.2
4	6.3	10.3	16.0	23.2	31.2	43.0	53.9	83.5	129.0	184.0
4½	7.0	11.3	17.5	25.2	33.8	46.5	58.0	89.5	137.2	194.8
5	7.6	12.2	18.9	27.1	36.3	49.9	62.1	95.4	145.4	205.6
5½	8.3	13.2	20.4	29.1	38.9	53.4	66.2	101.4	153.6	216.4
6	8.9	14.1	21.8	31.0	41.4	56.8	70.3	107.3	161.8	227.2
6½	9.6	15.1	23.3	33.0	44.0	60.3	74.4	113.3	170.0	238.0
7	10.2	16.0	24.7	34.9	46.5	63.7	78.5	119.2	178.2	248.8
7½	10.9	17.0	26.2	36.9	49.1	67.2	82.6	125.2	186.4	259.6
8	11.5	17.9	27.6	38.8	51.6	70.6	86.7	131.1	194.6	270.4
9	....	....	30.5	42.7	56.7	77.5	94.9	143.0	211.0	292.0
10	....	....	33.4	46.6	61.8	84.4	103.1	154.9	227.4	313.6
11	....	....	36.3	50.5	66.9	91.3	111.3	166.8	243.8	335.2
12	....	....	39.2	54.4	72.0	98.2	119.5	178.7	260.2	356.8
13	....	....	....	....	77.1	105.1	127.7	190.6	276.6	378.4
14	....	....	....	....	82.2	112.0	135.9	202.5	293.0	400.0
15	....	....	....	....	87.3	118.9	144.1	214.4	309.4	421.6
16	....	....	....	....	92.4	125.8	152.3	226.3	325.8	443.2
17	....	....	....	....	97.5	132.7	160.5	238.2	342.2	464.8
18	....	....	....	....	102.6	139.6	168.7	250.1	358.6	486.4
19	....	....	....	....	107.7	146.5	176.9	262.0	375.0	508.0
20	....	....	....	....	112.8	153.4	185.1	273.9	391.4	529.6
21	....	....	....	....	....	....	193.3	285.8	407.8	551.2
22	....	....	....	....	....	....	201.5	297.7	424.2	572.8
23	....	....	....	....	....	....	209.7	309.6	440.6	594.4
24	....	....	....	....	....	....	217.9	321.5	457.0	616.0
25	....	....	....	....	....	....	226.1	333.4	473.4	637.6
26	....	....	....	....	....	....	234.3	345.3	489.8	659.2
27	....	....	....	....	....	....	242.5	357.2	506.2	680.8
28	....	....	....	....	....	....	250.7	369.1	522.6	702.4
29	....	....	....	....	....	....	258.9	381.0	539.0	724.0
30	....	....	....	....	....	....	267.1	392.9	555.4	745.6

Average Weight Per Hundred of Common Carriage Bolts

POUNDS

Length, Inches	Diameter—Inches						
	¼	5/16	⅜	7/16	½	⅝	¾
1½	3.2	5.6	8.5	12.8	17.1	31.2	....
2	3.9	6.5	10.0	14.7	19.6	35.3	....
2½	4.5	7.5	11.4	16.7	22.2	39.4	58.4
3	5.2	8.4	12.9	18.6	24.7	43.5	64.4
3½	5.8	9.4	14.3	20.6	27.3	47.6	70.3
4	6.5	10.3	15.8	22.5	29.8	51.7	76.3
4½	7.1	11.3	17.2	24.5	32.4	55.8	82.2
5	7.8	12.2	18.7	26.4	34.9	59.9	88.2
5½	8.4	13.2	20.1	28.4	37.5	64.0	94.1
6	9.1	14.1	21.6	30.3	40.0	68.1	100.1
6½	9.7	15.1	23.0	32.3	42.6	72.2	106.0
	10.4	16.0	24.5	34.2	45.1	76.3	112.0
7½	11.0	17.0	25.9	36.2	47.7	80.4	117.9
8	11.7	17.9	27.4	38.1	50.2	84.5	123.9
8½	12.3	18.9	28.8	40.1	52.8	88.6	129.8
9	13.0	19.8	30.3	42.0	55.3	92.7	135.8
9½	13.6	20.8	31.7	44.0	57.9	96.8	141.7
10	14.3	21.7	33.2	45.9	60.4	100.9	147.7
10½	14.9	22.7	34.6	47.9	63.0	105.0	153.6
11	15.6	23.6	36.1	49.8	65.5	109.1	159.6
11½	16.2	24.6	37.5	51.8	68.1	113.2	165.5
12	16.9	25.5	39.0	53.7	70.6	117.3	171.5

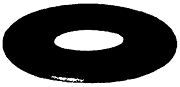


Fig. 1187

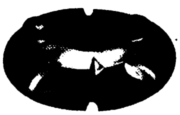
Wrought Washers

UNITED STATES STANDARD SIZES

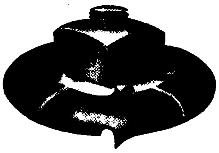
List Adopted January 20th, 1910

Size of Bolt, Inches	Price, Per 100 Pounds	Average Number of Washers In 100 Pounds	Diameter, Inches	Size of Hole, Inches	Thickness, Wire Gauge Number
3/16	$14.00	39,400	9/16	1/4	18
1/4	12.20	15,600	3/4	5/16	16
5/16	11.40	11,250	7/8	3/8	16
3/8	10.50	6,800	1	7/16	14
7/16	9.80	4,300	1 1/4	1/2	14
1/2	9.40	2,600	1 3/8	9/16	12
9/16	9.30	2,250	1 1/2	5/8	12
5/8	9.20	1,300	1 3/4	11/16	10
3/4	9.10	1,010	2	13/16	10
7/8	9.00	860	2 1/4	15/16	9
1	9.00	625	2 1/2	1 1/16	9
1 1/8	9.00	520	2 3/4	1 1/4	9
1 1/4	9.20	400	3	1 3/8	9
1 3/8	9.20	300	3 1/4	1 1/2	8
1 1/2	9.20	280	3 1/2	1 5/8	8
1 5/8	9.50	240	3 3/4	1 3/4	8
1 3/4	9.50	215	4	1 7/8	8
1 7/8	9.50	190	4 1/4	2	8
2	9.50	175	4 1/2	2 1/8	8

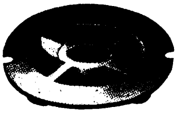
Malleable Iron Washers



Top View
Fig. 1188



Style No. 10
Fig. 1189



Bottom View
Fig. 1190

These washers are made of malleable iron as a substitute for common cast iron washers, for 1/2-inch bolts and larger.

In tensile strength they are four times as strong and approximately one-third the weight of common cast iron washers.

They are clean, perfect castings, with holes clear and free from fins or burrs.

Size of bolt..............inches	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
Diameter ....inches	2 1/2	2 3/4	3	3 1/2	4	4 1/2	5	6	6	7 1/2
Thickness .... “	1/4	5/16	7/16	7/16	1/2	1/2	5/8	3/4	3/4	3/4
Weight per 100 washers..pounds	15	22	33	50	68	87	150	190	206	420
Price.................per pound	$0.10	.10	.10	.10	.10	.10	.10	.10	.10	.10

IN KEGS OF 200 POUNDS.

Cast Iron Washers

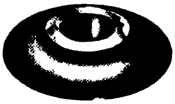
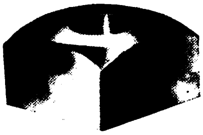


Fig. 1191

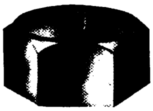
Size of bolt........inches	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 3/4	2
Diameter ....inches	2 3/8	3	3 1/4	3 5/8	4	4 1/2	5 3/8	5 5/8	6	7	8 1/2
Thickness .... “	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4
Weight each.......pounds	3/8	3/4	1	1 1/2	2	3	4 1/2	5 1/4	6 1/2	7 1/2	8 1/2
Price...........per pound	$0.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05

Hot Pressed Nuts

UNITED STATES STANDARD



Square—Blank
Fig. 1192



Hexagon—Blank
Fig. 1193

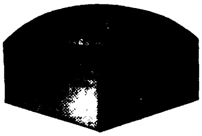
List Adopted January 1st, 1906

Short Diameter, Inches	Thickness, Inches	Diameter of Hole, Inches	Size of Bolt, Inches	Square		Hexagon	
				Price Per 100 Pounds		Price Per 100 Pounds	
				Blank	Tapped	Blank	Tapped
1/2	1/4	.185= 3/16 scant	1/4	$13.00	$15.00	$20.00	$22.50
19/32	5/16	.240= 1/4 scant	5/16	12.00	13.50	18.00	20.00
11/16	3/8	.294= 19/64 scant	3/8	10.50	11.60	14.00	15.60
25/32	7/16	.344= 11/32	7/16	10.00	10.90	13.00	14.30
7/8	1/2	.400= 13/32 scant	1/2	9.00	9.70	11.20	12.20
31/32	9/16	.454= 29/64	9/16	9.00	9.60	11.20	12.10
1 1/16	5/8	.507= 1/2 full	5/8	8.70	9.20	10.50	11.20
1 1/4	3/4	.620= 5/8 scant	3/4	8.50	8.90	10.00	10.60
1 7/16	7/8	.731= 47/64 scant	7/8	8.40	8.80	9.90	10.50
1 5/8	1	.837= 27/32 scant	1	8.40	8.80	9.90	10.50
1 13/16	1 1/8	.940= 15/16 full	1 1/8	8.40	8.80	9.90	10.50
2	1 1/4	1.065=1 1/16 full	1 1/4	8.40	8.80	9.90	10.50
2 3/16	1 3/8	1.160=1 5/32 full	1 3/8	8.50	9.00	10.00	10.70
2 3/8	1 1/2	1.284=1 9/32 full	1 1/2	8.80	9.40	10.30	11.10
2 9/16	1 5/8	1.389=1 25/64 scant	1 5/8	9.00	9.70	10.50	11.40
2 3/4	1 3/4	1.491=1 1/2 scant	1 3/4	9.30	10.00	10.80	11.70
2 15/16	1 7/8	1.616=1 5/8 scant	1 7/8	9.50	10.30	11.00	12.00
3 1/8	2	1.712=1 23/32 scant	2	9.70	10.60	11.20	12.30
3 5/16	2 1/8	1.836=1 27/32 scant	2 1/8	10.00	11.00	11.70	12.90
3 1/2	2 1/4	1.962=1 31/32 scant	2 1/4	10.00	11.10	11.70	13.00
3 11/16	2 3/8	2.086=2 5/64 scant	2 3/8	10.30	11.50	12.20	13.60
3 7/8	2 1/2	2.176=2 11/64 full	2 1/2	10.50	11.80	12.40	13.90
4 1/4	2 3/4	2.426=2 27/64 full	2 3/4	11.00	12.40	13.00	14.60
4 5/8	3	2.629=2 5/8 full	3	11.50	13.00	13.50	15.20

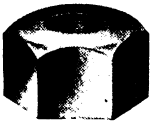
For less than keg lots (200 pounds) of a size, the following extras will be charged, viz.:
At the rate of 20 cents per 100 pounds for 100 pounds or more.
At the rate of 50 cents per 100 pounds for less than 100 pounds.
When ordering, always state whether blank or tapped nuts are wanted.

Hot Pressed Nuts

MANUFACTURERS' STANDARD



Square—Blank
Fig. 1194



Hexagon—Blank
Fig. 1195

List Adopted March 1st, 1911

Square						Hexagon					
Short Diameter, Inches	Thickness, Inches	Diameter of Hole, Inches	Size of Bolt, Inches	Price Per 100 Pounds		Short Diameter, Inches	Thickness, Inches	Diameter of Hole, Inches	Size of Bolt, Inches	Price Per 100 Pounds	
				Blank	Tapped					Blank	Tapped
½	¼	7/32	¼	$13.00	$15.00	½	¼	7/32	¼	$20.00	$22.50
⅝	5/16	9/32	5/16	11.50	13.00	⅝	5/16	9/32	5/16	16.00	18.00
¾	⅜	11/32	⅜	10.00	11.10	¾	⅜	11/32	⅜	13.00	14.60
⅞	7/16	25/64	7/16	9.20	10.10	⅞	7/16	25/64	7/16	11.40	12.70
1	½	7/16	½	8.70	9.40	1	½	7/16	½	10.50	11.50
1⅛	9/16	½	9/16	8.60	9.20	1⅛	9/16	½	9/16	10.40	11.30
1¼	⅝	9/16	⅝	8.50	9.00	1¼	⅝	9/16	⅝	10.10	10.80
1½	¾	21/32	¾	8.40	8.80	1⅜	¾	21/32	¾	10.00	10.60
1¾	⅞	25/32	⅞	8.40	8.80	1⅝	⅞	25/32	⅞	9.90	10.50
2	1	⅞	1	8.40	8.80	1¾	1	⅞	1	9.90	10.50
2¼	1⅛	31/32	1⅛	8.40	8.80	2	1¼	31/32	1⅛	9.90	10.50
2½	1¼	1 3/32	1¼	8.40	8.80	2¼	1⅜	1 3/32	1¼	9.90	10.50
2¾	1⅜	1 3/16	1⅜	8.50	9.00	2½	1½	1 3/16	1⅜	10.00	10.70
3	1½	1 5/16	1½	8.70	9.30	2¾	1⅝	1 5/16	1½	10.20	11.00
3¼	1⅝	1 7/16	1⅝	8.90	9.60	3	1¾	1 7/16	1⅝	10.40	11.30
3½	1¾	1 9/16	1¾	9.20	9.90	3¼	1⅞	1 9/16	1¾	10.70	11.60
3¾	1⅞	1 11/16	1⅞	9.40	10.20	3½	2	1 11/16	1⅞	10.90	11.90
4	2	1 13/16	2	9.60	10.50	3½	2	1 13/16	2	11.10	12.20
4	2⅛	1⅞	2⅛	9.70	10.70	3¾	2⅛	1⅞	2⅛	11.40	12.60
4¼	2¼	2	2¼	9.90	11.00	3¾	2¼	2	2¼	11.60	12.90
4¼	2⅜	2⅛	2⅜	10.10	11.30	4	2⅜	2⅛	2⅜	12.00	13.40

For less than keg lots (200 pounds) of a size, the following extras will be charged, viz.:

At the rate of 20 cents per 100 pounds for 100 pounds or more.

At the rate of 50 cents per 100 pounds for less than 100 pounds.

When ordering nuts other than United States Standard sizes, always give the short diameter, thickness, and diameter of hole wanted.

When ordering, always state whether blank or tapped nuts are wanted.

Useful Information

Pages 432 to 440 Inclusive

Horse-Power of Steel Shafting

The table given below is for ordinary line shafting running under favorable conditions and supported by bearings at intervals of about 8 feet. We do not guarantee the correctness of this table, as the conditions under which shafting is operated differ too radically for it to be satisfactorily applied in all cases.

Size of Shaft, Inches	Revolutions Per Minute									
	100	125	150	175	200	225	250	300	350	400
$1\frac{3}{16}$	2.4	3.1	3.7	4.3	4.9	5.5	6.1	7.3	8.5	9.7
$1\frac{7}{16}$	4.3	5.3	6.4	7.4	8.5	9.5	10.5	12.7	14.8	16.9
$1\frac{11}{16}$	6.7	8.4	10.1	11.7	13.4	15.1	16.7	20.1	23.4	26.8
$1\frac{15}{16}$	10.0	12.5	15.0	17.5	20.0	22.5	25.0	30.0	35.0	40.0
$2\frac{3}{16}$	14.3	17.8	21.4	24.9	28.5	32.1	35.6	42.7	49.8	57.0
$2\frac{7}{16}$	19.5	24.4	29.3	34.1	39.0	44.1	48.7	58.5	68.2	78.0
$2\frac{11}{16}$	26.0	32.5	39.0	43.5	52.0	58.5	65.0	78.0	87.0	104.0
$2\frac{15}{16}$	33.8	42.2	50.6	59.1	67.5	75.9	84.4	101.3	118.2	135.0
$3\frac{3}{16}$	43.0	53.6	64.4	75.1	85.8	96.6	107.3	128.7	150.3	171.6
$3\frac{7}{16}$	53.6	67.0	79.4	93.8	107.2	120.1	134.0	158.8	187.6	214.4
$3\frac{11}{16}$	65.9	82.4	97.9	115.4	121.8	148.3	164.8	195.7	230.7	243.6
$3\frac{15}{16}$	80.0	100.0	120.0	140.0	160.0	160.0	200.0	240.0	280.0	320.0
$4\frac{7}{16}$	113.9	142.4	170.8	199.3	227.8	256.2	284.7	341.7	398.6	455.6
$4\frac{15}{16}$	156.3	195.3	234.4	273.4	312.5	351.5	390.6	468.7	546.8	625.0
$5\frac{1}{2}$	207.9	260.0	311.9	363.9	415.9	459.9	520.0	623.9	727.9	830.0
6	270.0	337.5	405.0	472.5	540.0	607.5	675.0	810.0	945.0	1080.0
$6\frac{1}{2}$	343.3	429.0	514.9	600.7	686.5	772.4	858.0	1029.0	1201.0	1372.0
7	428.8	535.9	643.1	750.3	847.5	964.7	1071.9	1286.0	1500.0	1695.0
8	640.0	800.0	960.0	1126.0	1280.0	1440.0	1600.0	1920.0	2240.0	2560.0

For Head and Jack Shafts, supported by bearings close to main sheave or pulley, so as to prevent excessive transverse strain, the following formula may be used with safety:

$$H.P. = \frac{D^3 \times N}{125}$$

Wherein

D=Diameter of shaft in inches.
N=Number of revolutions per minute.
H.P.=Horse power.

Table of Capacity of Pumps

The figures at the extreme left of the table are piston, or plunger, diameters; the line of figures across the top are piston, or plunger, strokes; the figures in the body of the table are the capacity, or displacement, in gallons, corresponding to a single stroke. To find the capacity for one revolution, multiply the capacity for a single stroke by one, two, three or four for single, duplex, triplex, or quadruplex, single-acting, and by two, four or six for double-acting pumps.

Dia. of Cyl., In.	Area Circle, Square In	Length of Stroke in Inches, and Capacity of Stroke in Gallons, of Pump Cylinder with Given Diameter											
		4	5	6	8	10	12	14	15	16	18	20	24
1¼	1.23	.0212	.0266	.0319	.0425	.0531	.0637	.0742	.0797	.0848	.0955	.1062	.1274
1⅜	1.48	.0256	.0321	.0385	.0513	.0642	.077	.089	.0963	.1027	.1156	.1280	.1541
1½	1.77	.0306	.0382	.0459	.0612	.0765	.0918	.1071	.1147	.1224	.1377	.1530	.1836
1¾	2.41	.0416	.0521	.0625	.0833	.1041	.1249	.1457	.1562	.1666	.1874	.2082	.2499
2	3.14	.0544	.068	.0816	.1088	.136	.1632	.1904	.204	.2176	.2448	.2720	.3264
2¼	3.98	.0688	.086	.1033	.1377	.1721	.2063	.241	.258	.2754	.3096	.3442	.4128
2½	4.91	.085	.1062	.1275	.17	.2125	.255	.2975	.3187	.34	.3825	.425	.51
2¾	5.94	.1028	.1285	.1543	.2057	.2571	.3085	.3598	.3855	.4114	.4626	.5142	.617
3	7.07	.1224	.1530	.1836	.2448	.306	.3672	.4284	.459	.4896	.5508	.612	.7344
3¼	8.30	.1436	.1795	.2154	.2872	.3594	.4312	.503	.5385	.5748	.6466	.7182	.8624
3½	9.62	.1666	.2082	.2499	.3332	.4165	.4998	.5831	.6247	.6664	.7497	.833	.9996
3¾	11.05	.1912	.239	.2868	.3824	.478	.5736	.6692	.687	.7648	.8605	.9561	1.147
4	12.57	.2176	.272	.3264	.4352	.544	.6528	.7616	.816	.8704	.9792	1.088	1.3056
4¼	14.19	.2456	.307	.3684	.4912	.6141	.7368	.8596	.921	.9824	1.105	1.228	1.473
4½	15.90	.2754	.3442	.4131	.5508	.6885	.8262	.9639	1.0327	1.1016	1.2393	1.377	1.6524
4¾	17.73	.3068	.3835	.4602	.6136	.7671	.9204	1.073	1.15	1.2227	1.380	1.534	1.84
5	19.64	.34	.425	.51	.68	.85	1.02	1.19	1.275	1.36	1.53	1.7	2.04
5¼	21.65	.3748	.4685	.5622	.7496	.9371	1.124	1.311	1.405	1.499	1.686	1.874	2.228
5½	23.76	.4114	.5142	.6171	.8228	1.0285	1.2342	1.4399	1.5427	1.6456	1.8513	2.057	2.4684
5¾	25.97	.4496	.562	.6744	.8992	1.124	1.348	1.573	1.686	1.789	2.022	2.248	2.696
6	28.27	.4896	.612	.7344	.9792	1.2240	1.4688	1.7136	1.8362	1.9584	2.2032	2.448	2.9376
6¼	30.68	.5312	.6640	.7968	1.062	1.328	1.593	1.859	1.992	2.124	2.39	2.656	3.186
6½	33.18	.5744	.7182	.8610	1.1488	1.4364	1.7955	2.0109	2.1546	2.2982	2.5885	2.8728	3.4473
6¾	35.79	.6196	.7745	.9294	1.239	1.549	1.858	2.168	2.323	2.479	2.788	3.098	3.716
7	38.49	.6664	.833	.9996	1.3328	1.666	1.9992	2.3324	2.499	2.6656	2.9988	3.332	3.9984
7¾	47.17	.8168	1.021	1.225	1.633	2.042	2.45	2.858	3.063	3.266	3.674	4.084	4.9
8	50.27	.8704	1.088	1.3056	1.7408	2.176	2.6112	3.0464	3.264	3.4816	3.9168	4.352	5.2224
9	63.62	1.1010	1.377	1.6524	2.2032	2.754	3.3048	3.8556	4.131	4.4064	5.0572	5.508	6.6096
10	78.54	1.36	1.7	2.04	2.72	3.4	4.08	4.76	5.1	5.44	6.12	6.8	8.16
11	95.03	1.6451	2.057	2.464	3.2911	4.1139	4.9367	5.7595	6.1709	6.5823	7.4051	8.2279	9.8735
12	113.10	1.9584	2.448	2.9376	3.9168	4.896	5.8752	6.8544	7.344	7.833	8.8128	9.792	11.7504
13	132.73	2.297	2.872	3.445	4.596	5.745	6.894	8.042	8.616	9.192	10.34	11.49	13.78
14	153.94	2.665	3.331	3.997	5.33	6.663	7.994	9.328	9.993	10.66	11.99	13.32	15.98
15	176.71	3.059	3.824	4.589	6.119	7.649	9.178	10.70	11.47	12.23	13.76	15.29	18.35
16	201.06	3.48	4.35	5.22	6.96	8.703	10.44	12.18	13.05	13.92	15.66	17.40	20.88
18	254.47	4.404	5.505	6.606	8.808	11.01	13.21	15.41	16.51	17.61	19.81	22.02	26.42
20	314.16	5.440	6.8	8.16	10.88	13.6	16.32	19.04	20.4	21.76	24.48	27.2	32.64

TABLE FOR CONVERTING FEET HEAD OF WATER INTO PRESSURE PER SQUARE INCH

Feet Head	Pounds per Square Inch	Feet Head	Pounds per Square Inch	Feet Head	Pounds per Square Inch
1	.43	55	23.82	190	82.29
2	.87	60	25.99	200	86.62
3	1.30	65	28.15	225	97.45
4	1.73	70	30.32	250	108.27
5	2.17	75	32.48	275	119.10
6	2.60	80	34.65	300	129.93
7	3.03	85	36.81	325	140.75
8	3.40	90	38.98	350	151.58
9	3.90	95	41.14	375	162.41
10	4.33	100	43.31	400	173.24
15	6.50	110	47.64	500	216.55
20	8.66	120	51.97	600	259.85
25	10.83	130	56.30	700	303.16
30	12.99	140	60.63	800	346.47
35	15.16	150	64.96	900	389.78
40	17.32	160	69.29	1000	433.09
45	19.49	170	73.63	...	......
50	21.65	180	77.96	...	......

TABLE FOR CONVERTING PRESSURE PER SQUARE INCH INTO FEET HEAD OF WATER

Pounds per Square Inch	Feet Head	Pounds per Square Inch	Feet Head	Pounds per Square Inch	Feet Head
1	2.31	55	126.99	180	415.61
2	4.62	60	138.54	190	438.90
3	6.93	65	150.08	200	461.78
4	9.24	70	161.63	225	519.51
5	11.54	75	173.17	250	577.24
6	13.85	80	184.72	275	643.03
7	16.16	85	196.26	300	692.69
8	18.47	90	207.81	325	750.41
9	20.78	95	219.35	350	808.13
10	23.09	100	230.90	375	865.89
15	34.63	110	253.98	400	922.58
20	46.18	120	277.07	500	1154.48
25	57.72	125	288.62	...	....
30	69.27	130	300.16	...	....
35	80.81	140	323.25	...	....
40	92.36	150	346.34	...	....
45	103.90	160	369.43	...	....
50	115.45	170	392.52	...	....

Table of Theoretical Horse-Power Required to Raise Water to Different Heights

Gals. per Min.	5 Feet	10 Feet	15 Feet	20 Feet	25 Feet	30 Feet	35 Feet	40 Feet	45 Feet	50 Feet	60 Feet	Gals. per Min.
5	.006	.012	.019	.025	.031	.037	.044	.05	.06	.06	.07	5
10	.012	.025	.037	.050	.062	.075	.087	.10	.11	.12	.15	10
15	.019	.037	.056	.075	.094	.112	.131	.15	.17	.19	.22	15
20	.025	.050	.075	.100	.125	.150	.175	.20	.22	.25	.30	20
25	.031	.062	.093	.125	.156	.187	.219	.25	.28	.31	.37	25
30	.037	.075	.112	.150	.187	.225	.262	.30	.34	.37	.45	30
35	.043	.087	.131	.175	.219	.262	.306	.35	.39	.44	.52	35
40	.050	.100	.150	.200	.250	.300	.350	.40	.45	.50	.60	40
45	.056	.112	.168	.225	.281	.337	.394	.45	.51	.56	.67	45
50	.062	.125	.187	.250	.312	.375	.437	.50	.56	.62	.75	50
60	.075	.150	.225	.300	.375	.450	.525	.60	.67	.75	.90	60
75	.093	.187	.281	.375	.469	.562	.656	.75	.84	.94	1.12	75
90	.112	.225	.337	.450	.562	.675	.787	.90	1.01	1.12	1.35	90
100	.125	.250	.375	.500	.625	.750	.875	1.00	1.12	1.25	1.50	100
125	.156	.312	.469	.625	.781	.937	1.094	1.25	1.41	1.56	1.87	125
150	.187	.375	.562	.750	.937	1.125	1.312	1.50	1.69	1.87	2.25	150
175	.219	.437	.656	.875	1.093	1.312	1.531	1.75	1.97	2.19	2.62	175
200	.250	.500	.750	1.000	1.250	1.500	1.750	2.00	2.25	2.50	3.00	200
250	.312	.625	.937	1.250	1.562	1.875	2.187	2.50	2.81	3.12	3.75	250
300	.375	.750	1.125	1.500	1.875	2.250	2.625	3.00	3.37	3.75	4.50	300
350	.437	.875	1.312	1.750	2.187	2.625	3.062	3.50	3.94	4.37	5.25	350
400	.500	1.000	1.500	2.000	2.500	3.000	3.500	4.00	4.50	5.00	6.00	400
500	.625	1.250	1.875	2.500	3.125	3.750	4.375	5.00	5.62	6.25	7.50	500

Gals. per Min.	75 Feet	90 Feet	100 Feet	125 Feet	150 Feet	175 Feet	200 Feet	250 Feet	300 Feet	350 Feet	400 Feet	Gals. per Min.
5	.09	.11	.12	.16	.19	.22	.25	.31	.37	.44	.50	5
10	.19	.22	.25	.31	.37	.44	.50	.62	.75	.87	1.00	10
15	.28	.34	.37	.47	.56	.66	.75	.94	1.12	1.31	1.50	15
20	.37	.45	.50	.62	.75	.87	1.00	1.25	1.50	1.75	2.00	20
25	.47	.56	.62	.78	.94	1.09	1.25	1.56	1.87	2.19	2.50	25
30	.56	.67	.75	.94	1.12	1.31	1.50	1.87	2.25	2.62	3.00	30
35	.66	.79	.87	1.08	1.31	1.53	1.75	2.19	2.62	3.06	3.50	35
40	.75	.90	1.00	1.25	1.50	1.75	2.00	2.50	3.00	3.50	4.00	40
45	.84	1.01	1.12	1.41	1.69	1.97	2.25	2.81	3.37	3.94	4.50	45
50	.94	1.12	1.25	1.56	1.87	2.19	2.50	3.12	3.75	4.37	5.00	50
60	1.12	1.35	1.50	1.87	2.25	2.62	3.00	3.75	4.50	5.25	6.00	60
75	1.40	1.69	1.87	2.34	2.81	3.28	3.75	4.69	5.62	6.56	7.50	75
90	1.68	2.02	2.25	2.81	3.37	3.94	4.50	5.62	6.75	7.87	9.00	90
100	1.87	2.25	2.50	3.12	3.75	4.37	5.00	6.25	7.50	8.75	10.00	100
125	2.34	2.81	3.12	3.91	4.69	5.47	6.25	7.81	9.37	10.94	12.50	125
150	2.81	3.37	3.75	4.69	5.62	6.56	7.50	9.37	11.25	13.12	15.00	150
175	3.28	3.94	4.37	5.47	6.56	7.66	8.75	10.94	13.12	15.31	17.50	175
200	3.75	4.50	5.00	6.25	7.50	8.75	10.00	12.50	15.00	17.50	20.00	200
250	4.69	5.62	6.25	7.81	9.37	10.94	12.50	15.72	18.75	21.87	25.00	250
300	5.62	6.75	7.50	9.37	11.25	13.12	15.00	18.75	22.50	26.25	30.00	300
350	6.56	7.87	8.75	10.94	13.12	15.31	17.50	21.87	26.25	30.62	35.00	350
400	7.50	9.00	10.00	12.50	15.00	17.50	20.00	25.00	30.00	35.00	40.00	400
500	9.37	11.25	12.50	15.62	18.75	21.87	25.00	31.25	37.50	43.75	50.00	500

Inches of Mercury with Equivalent Water Head in Feet

Inches	Head	Inches	Head	Inches	Head	Inches	Head	Inches	Head
1	1.13	7	7.91	13	14.69	19	21.47	25	28.25
2	2.26	8	9.04	14	15.82	20	22.60	26	29.38
3	3.39	9	10.17	15	16.95	21	23.73	27	30.51
4	4.52	10	11.30	16	18.08	22	24.86	28	31.64
5	5.65	11	12.43	17	19.21	23	25.99	29	32.77
6	6.78	12	13.56	18	20.34	24	27.12	30	33.90

Table Showing the Number of Feet, Board Measure, Contained in a Piece of Joist, Scantling or Timber

Size, Inches	Length in Feet of Joists, Scantling and Timber												
	12	14	16	18	20	22	24	26	28	30	42	44	45
2 x 4..........	8	9	11	12	13	15	16	17	19	20	28	29	30
2 x 6..........	12	14	16	18	20	22	24	26	28	30	42	44	45
2 x 8..........	16	19	21	24	27	29	32	35	37	40	53	58	60
2 x 10..........	20	23	27	30	33	37	40	43	47	50	70	74	75
2 x 12..........	24	28	32	36	40	44	48	52	56	60	84	88	90
3 x 4..........	12	14	16	18	20	22	24	26	28	30	42	44	45
3 x 6....	18	21	24	27	30	33	36	39	42	45	63	66	68
3 x 8..........	24	28	32	36	40	44	48	52	56	60	84	88	90
3 x 10..........	30	35	40	45	50	55	60	65	70	75	105	110	113
3 x 12..........	36	42	48	54	60	66	72	78	84	90	126	132	135
4 x 4..........	16	19	21	24	27	29	32	35	37	40	56	58	60
4 x 6..........	24	28	32	36	40	44	48	52	56	60	84	88	90
4 x 8..........	32	37	43	48	53	59	64	69	75	80	112	118	120
4 x 10..........	40	47	53	60	67	73	80	87	93	100	140	146	150
4 x 12..........	48	56	64	72	80	88	96	104	112	120	168	176	180
6 x 6..........	36	42	48	54	60	66	72	78	84	90	126	132	135
6 x 8..........	48	56	64	72	80	88	96	104	112	120	168	176	180
6 x 10..........	60	70	80	90	100	110	120	130	140	150	210	220	225
6 x 12..........	72	84	96	108	120	132	144	156	168	180	250	265	270
8 x 8..........	64	75	85	96	107	117	128	139	149	160	224	234	240
8 x 10..........	80	93	107	120	133	147	160	173	187	200	280	294	300
8 x 12..........	96	112	128	144	160	176	192	208	224	240	336	352	360
10 x 10..........	100	117	133	150	167	183	200	217	233	250	350	366	375
10 x 12..........	120	140	160	180	200	220	240	260	280	300	420	440	450
12 x 12..........	144	168	192	216	240	264	288	312	336	360	504	528	540
12 x 14..........	168	196	224	252	280	308	336	364	392	420	588	616	630
14 x 14..........	196	229	261	294	327	359	392	425	457	490	686	716	735

Friction of Water in Elbows

PRESSURE IN POUNDS PER SQUARE INCH TO BE ADDED FOR EACH ELBOW

Gals. per Min. Delivered	Pipe Sizes														
	¾	1	1¼	1½	2	2½	3	3½	4	5	6	7	8	9	10	12
5	.07	.027	.008	.005	.002	.....	.....	.....	.....	.....	.....	....	....	....	....	....
10	.28	.094	.031	.018	.006	.003	.....	.....	.....	.....	.....	....	....	....	....	....
15	.63	.212	.069	.04	.014	.005	.....	.....	.....	.....	.....	....	....	....	....	....
20	1.12	.376	.123	.069	.025	.012	.005	.....	.....	.....	.....	....	....	....	....	....
25	1.74	.585	.194	.108	.038	.02	.008	.....	.....	.....	.....	....	....	....	....	....
30	....	.845	.278	.157	.055	.028	.011	.....	.....	.....	.....	....	....	....	....	....
35	....	1.15	.380	.215	.076	.037	.015	.009	.....	.....	.....	....	....	....	....	....
40	....	1.50	.495	.278	.098	.049	.02	.011	.007	.....	.....	....	....	....	....	....
45	....	1.90	.626	.352	.125	.062	.026	.015	.009	.....	.....	....	....	....	....	....
50	....	.....	.77	.43	.153	.08	.032	.017	.01	.....	.....	....	....	....	....	....
60	....	3.38	1.11	.62	.22	.112	.044	.026	.015	.006	.003	....	....	....	....	....
70	....	4.60	1.52	.86	.304	.148	.06	.035	.021	.009	.004	.002	....	....	....	....
75	....	5.30	1.74	.98	.35	.172	.072	.04	.024	.01	.005	.003	....	....	....	....
80	....	6.00	1.98	1.11	.392	.196	.08	.044	.027	.012	.005	.003	....	....	....	....
90	....	7.60	2.50	1.41	.50	.248	.104	.06	.035	.014	.007	.004	....	....	....	....
100	....	.....	3.08	1.72	.612	.32	.128	.068	.043	.017	.008	.005	.003	.002	....	....
125	....	.....	.....	2.72	.97	.48	.20	.112	.067	.027	.013	.007	.004	.003	.002	....
150	....	.....	.....	3.92	1.39	.685	.286	.16	.096	.039	.019	.01	.006	.004	.003	.001
175	....	.....	.....	5.32	1.90	.935	.390	.218	.132	.053	.026	.014	.009	.005	.004	.002
200	....	.....	.....	6.88	2.44	1.28	.512	.272	.172	.068	.032	.02	.011	.007	.005	.002
250	....	.....	.....	.....	3.86	1.91	.80	.446	.268	.109	.052	.029	.017	.011	.007	.004
300	....	.....	.....	.....	5.56	2.74	1.14	.64	.384	.156	.076	.042	.025	.016	.01	.005
350	....	.....	.....	.....	.....	3.77	1.58	.88	.530	.215	.103	.057	.034	.022	.014	.007
400	....	.....	.....	.....	.....	5.12	2.05	1.09	.688	.272	.128	.08	.044	.028	.018	.009
450	....	.....	.....	.....	.....	6.20	2.58	1.45	.870	.352	.170	.094	.057	.036	.023	.011
500	....	.....	.....	.....	.....	7.64	3.20	1.78	1.07	.436	.208	.116	.068	.044	.028	.016
750	....	.....	.....	.....	.....	.....	.....	.....	2.42	.970	.470	.260	.156	.10	.063	.031
1000	....	.....	.....	.....	.....	.....	.....	.....	4.28	1.74	.832	.464	.272	.176	.112	.064
1250	....	.....	.....	.....	.....	.....	.....	.....	6.70	2.71	1.31	.728	.435	.276	.175	.086
1500	....	.....	.....	.....	.....	.....	.....	.....	9.68	3.88	1.88	.84	.624	.40	.252	.124

Table is based on Weisbach's formula for very short bends, or with a radius equal to the radius of the pipe. To find "Friction Head" in feet, multiply figures by 2.3.

Friction of Water in Pipes

PRESSURE IN POUNDS PER SQUARE INCH TO BE ADDED FOR EACH 100 FEET OF CLEAN IRON PIPE

Gallons Per Minute Delivered	Pipe Sizes										
	¾	1	1¼	1½	2	2½	3	3½	4	5	6
5	3.3	.84	.31	.12	.04	.02	......	......	......	......	......
10	13.0	3.16	1.05	.47	.12	.04	.02	......	......	......	......
15	28.7	6.98	2.38	.97	.25	.08	.04	.02	......	......	......
20	50.4	12.3	4.07	1.66	.42	.14	.06	.03	......	......	......
25	78.0	19.0	6.40	2.62	.62	.21	.10	.04	.02	......	......
30	......	27.5	9.15	3.75	.91	.30	.13	.06	.03	......	......
35	......	37.0	12.4	5.05	1.22	.40	.17	.09	.05	.02	......
40	......	48.0	16.1	6.52	1.60	.53	.23	.11	.06	.02	......
45	......	......	20.2	8.15	1.99	.66	.28	.14	.07	.03	......
50	......	......	24.9	10.0	2.44	.81	.35	.17	.09	.04	......
60	......	......	36.0	14.0	3.50	1.17	.50	.24	.13	.05	.02
70	......	......	48.0	20.0	4.80	1.50	.60	.38	.19	.07	.03
75	......	......	56.1	22.4	5.32	1.80	.74	......	......	......	......
80	......	......	64.0	25.0	6.30	2.00	.90	.41	.23	.08	.03
90	......	......	80.0	32.0	7.80	2.58	1.10	.54	.26	.09	.04
100	......	......	......	39.0	9.46	3.20	1.31	.64	.33	.12	.05
125	......	......	......	......	14.9	4.89	1.99	.96	.49	.17	.07
150	......	......	......	......	21.2	7.00	2.85	1.35	.69	.25	.10
175	......	......	......	......	28.1	9.46	3.85	1.82	.93	.34	.13
200	......	......	......	......	37.5	12.47	5.02	2.38	1.22	.42	.17
250	......	......	......	......	......	19.66	7.76	3.70	1.89	.65	.26
300	......	......	......	......	......	28.06	11.2	5.04	2.66	.93	.37
350	......	......	......	......	......	......	15.2	7.10	3.65	1.26	.50
400	......	......	......	......	......	......	19.5	9.25	4.73	1.61	.65
450	......	......	......	......	......	......	25.0	11.70	6.01	2.00	.81
500	......	......	......	......	......	......	30.8	14.5	7.43	2.40	.96
750	......	......	......	......	......	......	......	......	......	......	2.21
1000	......	......	......	......	......	......	......	......	......	......	3.88
1250	......	......	......	......	......	......	......	......	......	......	6.00
1500	......	......	......	......	......	......	......	......	......	......	8.60

	7	8	9	10	12	14	16	18	20	24	30
100	.02	......	......	......	......	......	......	......	......	......	......
125	.03	......	......	......	......	......	......	......	......	......	......
150	.04	......	......	......	......	......	......	......	......	......	......
175	.05	......	......	......	......	......	......	......	......	......	......
200	.07	......	......	......	......	......	......	......	......	......	......
250	.12	.07	.04	.03	......	......	......	......	......	......	......
300	.17	.09	.05	.04	......	......	......	......	......	......	......
350	.23	.12	.07	.05	......	......	......	......	......	......	......
400	.30	.16	.09	.06	.02	.005	.001	......	......	......	......
450	.37	.20	.11	.07	.03	.008	.004	......	......	......	......
500	.45	.25	.14	.09	.04	.017	.009	.005	......	......	......
600	.61	.38	.21	.14	.07	.026	.014	.007	......	......	......
700	.77	.47	.27	.18	.08	.034	.017	.010	.002	......	......
750	1.03	.53	.30	.20	.08	.038	.019	.011	.003	......	......
800	1.08	.61	.34	.22	.09	.045	.023	.012	.004	......	......
900	1.33	.78	.41	.27	.11	.055	.028	.015	.008	.001	......
1000	1.80	.94	.53	.32	.13	.062	.036	.020	.012	.005	.002
1250	2.85	1.46	.82	.49	.20	.091	.049	.028	.021	.009	.003
1500	4.08	2.09	1.17	.70	.29	.135	.071	.040	.030	.014	.004
2000	......	......	......	......	......	.234	.123	.071	.042	.020	.006
2500	......	......	......	......	......	.362	.188	.117	.064	.032	.009
3000	......	......	......	......	......	.515	.267	.150	.091	.047	.012
3500	......	......	......	......	......	.697	.365	.204	.124	.055	.016
4000	......	......	......	......	......	.910	.472	.263	.158	.067	.022
4500	......	......	......	......	......	......	.593	.333	.189	.082	.027
5000	......	......	......	......	......	......	.730	.408	.244	.102	.035

Table is based on Ellis' and Howland's experiments. To find "Friction Head" in feet, multiply figures by 2.3.

Table of Areas of Circles

Diameter, Inches	Area, Sq. Inches	Diameter, Inches	Area, Sq. Inches	Diameter, Inches	Area, Sq. Inches	Diameter, Inches	Area, Sq. Inches
⅛	.012	7¾	47.17	18½	268.80	37½	1104.5
¼	.049	8	50.26	19	283.52	38	1134.1
⅜	.110	8¼	53.45	19½	298.64	38½	1164.2
½	.196	8½	56.74	20	314.16	39	1194.6
⅝	.307	8¾	60.13	20½	330.06	39½	1225.4
¾	.442	9	63.61	21	346.36	40	1256.6
⅞	.601	9¼	67.20	21½	363.05	40½	1288.3
1	.785	9½	70.88	22	380.13	41	1320.3
1⅛	.994	9¾	74.66	22½	397.60	41½	1352.7
1¼	1.227	10	78.54	23	415.47	42	1385.4
1⅜	1.484	10¼	82.51	23½	433.73	42½	1418.6
1½	1.767	10½	86.59	24	452.39	43	1452.2
1⅝	2.073	10¾	90.76	24½	471.43	43½	1486.2
1¾	2.405	11	95.03	25	490.87	44	1520.5
1⅞	2.761	11¼	99.40	25½	510.70	44½	1555.3
2	3.14	11½	103.86	26	530.93	45	1590.4
2¼	3.97	11¾	108.43	26½	551.54	45½	1626.0
2½	4.90	12	113.09	27	572.55	46	1661.9
2¾	5.93	12¼	117.85	27½	593.95	46½	1698.2
3	7.06	12½	122.71	28	615.75	47	1734.9
3¼	8.29	12¾	127.67	28½	637.94	47½	1772.1
3½	9.62	13	132.73	29	660.52	48	1809.6
3¾	11.04	13¼	137.88	29½	683.49	48½	1847.5
4	12.56	13½	143.13	30	706.86	49	1885.7
4¼	14.18	13¾	148.48	30½	730.61	49½	1924.4
4½	15.90	14	153.93	31	754.76	50	1963.5
4¾	17.72	14¼	159.48	31½	779.31	50½	2003.0
5	19.63	14½	165.13	32	804.25	51	2042.8
5¼	21.64	14¾	170.87	32½	829.57	51½	2083.1
5½	23.75	15	176.71	33	855.30	52	2123.7
5¾	25.96	15¼	182.65	33½	881.41	52½	2164.8
6	28.27	15½	188.69	34	907.92	53	2206.2
6¼	30.67	15¾	194.82	34½	934.82	53½	2248.0
6½	33.18	16	201.06	35	962.11	54	2290.2
6¾	35.78	16½	213.82	35½	989.80	54½	2332.8
7	38.48	17	226.98	36	1017.88	55	2375.8
7¼	41.28	17½	240.52	36½	1046.4	55½	2419.2
7½	44.17	18	254.46	37	1075.2	56	2463.0

Table of Decimal Equivalents

EIGHTHS

1-8 equals...... .125
1-4 equals...... .250
3-8 equals...... .375
1-2 equals...... .500
5-8 equals...... .625
3-4 equals...... .750
7-8 equals...... .875

SIXTEENTHS

1-16 equals.... .0625
3-16 equals.... .1875
5-16 equals.... .3125
7-16 equals.... .4375
9-16 equals... .5625
11-16 equals... .6875
13-16 equals... .8125
15-16 equals... .9375

THIRTY-SECONDS

1-32 equals.. .03125
3-32 equals.. .09375
5-32 equals.. .15625
7-32 equals.. .21875
9-32 equals.. .28125
11-32 equals.. .34375
13-32 equals.. .40625
15-32 equals.. .46875
17-32 equals.. .53125
19-32 equals.. .59375
21-32 equals.. .65625
23-32 equals.. .71875
25-32 equals.. .78125
27-32 equals.. .84375
29-32 equals.. .90625
31-32 equals.. .96875

SIXTY-FOURTHS

1-64 equals.. .015625
3-64 equals.. .046875
5-64 equals.. .071825
7-64 equals.. .109375
9-64 equals.. .140625
11-64 equals.. .171875
13-64 equals.. .203125
15-64 equals.. .234375
17-64 equals.. .265625
19-64 equals.. .296875
21-64 equals.. .328125
23-64 equals.. .359375
25-64 equals.. .390625
27-64 equals.. .421875
29-64 equals.. .453124
31-64 equals.. .484375
33-64 equals.. .515625
35-64 equals.. .546875
37-64 equals.. .578125
39-64 equals.. .609375
41-64 equals.. .640625
43-64 equals.. .671875
45-64 equals.. .703125
47-64 equals.. .734375
49-64 equals.. .765625
51-64 equals.. .796875
53-64 equals.. .828125
55-64 equals.. .859375
57-64 equals.. .890625
59-64 equals.. .921875
61-64 equals.. .953125
63-64 equals.. .984375

Product of Fractions Expressed in Decimals

0	1	1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	1
1/16	.0625	.0039	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1/8	.1250	.0078	.0156	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3/16	.1875	.0117	.0234	.0352	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1/4	.2500	.0156	.0313	.0469	.0625	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5/16	.3125	.0195	.0391	.0586	.0781	.0977	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3/8	.3750	.0234	.0469	.0703	.0937	.1172	.1406	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7/16	.4375	.0273	.0547	.0820	.1093	.1367	.1641	.1914	.....	.....	.....	.....	.....	.....	.....	.....	.....
1/2	.5000	.0313	.0625	.0938	.1250	.1562	.1875	.2188	.2500	.....	.....	.....	.....	.....	.....	.....	.....
9/16	.5625	.0352	.0703	.1055	.1406	.1758	.2109	.2461	.2813	.3164	.....	.....	.....	.....	.....	.....	.....
5/8	.6250	.0391	.0781	.1172	.1562	.1953	.2344	.2734	.3125	.3516	.3906	.....	.....	.....	.....	.....	.....
11/16	.6875	.0430	.0859	.1289	.1719	.2148	.2578	.3008	.3438	.3867	.4297	.4727	.....	.....	.....	.....	.....
3/4	.7500	.0469	.0938	.1406	.1875	.2344	.2813	.3281	.3750	.4219	.4688	.5156	.5625	.....	.....	.....	.....
13/16	.8125	.0508	.1016	.1523	.2031	.2539	.3047	.3555	.4063	.4570	.5078	.5586	.6094	.6601	.....	.....	.....
7/8	.8750	.0547	.1094	.1641	.2187	.2734	.3281	.3828	.4375	.4922	.5469	.6016	.6563	.7109	.7656	.....	.....
15/16	.9375	.0586	.1172	.1758	.2344	.2930	.3516	.4102	.4688	.5273	.5859	.6445	.7031	.7617	.8203	.8789	.....
1	1.000	.0625	.1250	.1875	.2500	.3125	.3750	.4375	.5000	.5625	.6250	.6875	.7500	.8125	.8750	.9375	1.000

Weights of Flat Iron per Lineal Foot

POUNDS

Width, Inches	Thickness in Inches									
	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8	1
1/2	.211	.361	.422	.491	.634	.....	.....	.....	.....	.....
5/8	.260	.420	.510	.640	.784	.90	.....	.....	.....	.....
3/4	.316	.471	.633	.790	.950	1.26	1.58	.....	.....	.....
7/8	.370	.551	.730	.915	1.09	1.46	1.82	2.19	.....	.....
1	.421	.623	.832	1.04	1.25	1.67	2.08	2.50	2.92	.....
1 1/8	.475	.700	.940	1.17	1.41	1.88	2.34	2.81	3.28	3.75
1 1/4	.524	.782	1.04	1.30	1.56	2.08	2.60	3.12	3.64	4.17
1 3/8	.574	.860	1.15	1.43	1.72	2.29	2.86	3.44	4.01	4.58
1 1/2	.631	.940	1.25	1.56	1.88	2.50	3.13	3.75	4.38	5.00
1 5/8	.682	1.02	1.35	1.69	2.03	2.71	3.38	4.01	4.74	5.42
1 3/4	.730	1.09	1.46	1.82	2.19	2.92	3.65	4.37	5.10	5.83
2	.831	1.24	1.67	2.08	2.50	3.33	4.17	5.00	5.83	6.67
2 1/4	.945	1.41	1.88	2.34	2.81	3.75	4.69	5.63	6.51	7.50
2 1/2	1.04	1.56	2.08	2.60	3.12	4.17	5.21	6.25	7.29	8.33
2 3/4	1.14	1.72	2.29	2.86	3.44	4.59	5.73	6.87	8.02	9.17
3	1.25	1.87	2.50	3.12	3.75	5.00	6.25	7.50	8.75	10.00
3 1/4	1.35	2.03	2.71	3.38	4.07	5.42	6.77	8.12	9.48	10.83
3 1/2	1.46	2.19	2.92	3.65	4.38	5.83	7.29	8.75	10.21	11.61
3 3/4	1.56	2.34	3.12	3.90	4.69	6.25	7.81	9.37	10.94	12.50
4	1.67	2.50	3.33	4.17	5.00	6.67	8.33	10.00	11.67	13.33
4 1/2	1.87	2.81	3.75	4.69	5.63	7.50	9.38	11.25	13.13	15.60
5	2.08	3.13	4.17	5.21	6.25	8.34	10.42	12.50	14.59	16.67
6	2.50	3.75	5.00	6.25	7.50	10.00	12.50	15.00	17.50	20.00

Weights of Round and Square Iron per Lineal Foot

POUNDS

Size, Inches	Round	Square	Size, Inches	Round	Square
3/16	.0930	.1184	1 3/4	8.101	10.31
7/32	.1266	.1612	1 7/8	9.300	11.84
1/4	.1653	.2105	2	10.58	13.47
9/32	.2093	.2665	2 1/8	11.95	15.21
5/16	.2583	.3290	2 1/4	13.39	17.05
11/32	.3126	.3980	2 3/8	14.92	19.00
3/8	.3720	.4736	2 1/2	16.53	21.05
13/32	.4365	.5558	2 5/8	18.23	23.21
7/16	.5063	.6446	2 3/4	20.01	25.47
1/2	.6613	.8420	2 7/8	21.87	27.84
9/16	.8370	1.066	3	23.81	30.31
5/8	1.033	1.316	3 1/4	27.94	35.57
11/16	1.250	1.592	3 1/2	32.41	41.26
3/4	1.488	1.895	3 3/4	37.20	47.37
13/16	1.746	2.223	4	42.33	53.89
7/8	2.025	2.579	4 1/4	47.78	60.84
15/16	2.325	2.960	4 1/2	53.57	68.20
1	2.645	3.368	4 3/4	59.69	75.99
1 1/16	2.986	3.803	5	66.13	84.20
1 1/8	3.348	4.263	5 1/4	72.91	92.83
1 3/16	3.730	4.750	5 1/2	80.02	101.9
1 1/4	4.133	5.263	5 3/4	87.46	111.4
1 5/16	4.557	5.802	6	95.23	121.3
1 3/8	5.001	6.368	6 1/2	111.8	142.3
1 7/16	5.466	6.960	7	129.6	165.0
1 1/2	5.952	7.578	7 1/2	148.8	189.5
1 9/16	6.458	8.223	8	169.3	215.6
1 5/8	6.985	8.893	8 1/2	191.1	243.4

Contents of Round Tanks in United States Gallons for Each Foot in Depth

Diameter		Gallons, One Foot in Depth	Diameter		Gallons, One Foot in Depth	Diameter		Gallons, One Foot in Depth
Feet	Inches		Feet	Inches		Feet	Inches	
1	0	5.9	11	0	710.9	21	0	2591.0
1	3	9.2	11	3	743.6	21	3	2653.0
1	6	13.2	11	6	777.0	21	6	2715.8
1	9	18.0	11	9	811.1	21	9	2779.3
2	0	23.5	12	0	846.0	22	0	2843.6
2	3	29.7	12	3	881.7	22	3	2908.6
2	6	36.7	12	6	918.0	22	6	2974.3
2	9	44.4	12	9	955.1	22	9	3040.8
3	0	52.9	13	0	992.9	23	0	3108.0
3	3	62.0	13	3	1031.5	23	3	3175.9
3	6	72.0	13	6	1070.8	23	6	3244.6
3	9	82.6	13	9	1110.8	23	9	3314.0
4	0	94.0	14	0	1151.5	24	0	3384.1
4	3	106.1	14	3	1193.0	24	3	3455.0
4	6	119.0	14	6	1235.3	24	6	3526.6
4	9	132.6	14	9	1278.2	24	9	3598.9
5	0	146.9	15	0	1321.9	25	0	3672.0
5	3	161.9	15	3	1366.4	25	3	3745.8
5	6	177.7	15	6	1411.5	25	6	3820.3
5	9	194.2	15	9	1457.4	25	9	3895.6
6	0	211.5	16	0	1504.1	26	0	3971.6
6	3	229.5	16	3	1551.4	26	3	4048.4
6	6	248.2	16	6	1599.5	26	6	4125.9
6	9	267.7	16	9	1648.4	26	9	4204.1
7	0	287.9	17	0	1697.9	27	0	4283.0
7	3	308.8	17	3	1748.2	27	3	4362.7
7	6	330.5	17	6	1799.3	27	6	4443.1
7	9	352.9	17	9	1851.1	27	9	4524.3
8	0	376.0	18	0	1903.6	28	0	4606.2
8	3	399.9	18	3	1956.8	28	3	4688.8
8	6	424.5	18	6	2010.8	28	6	4772.1
8	9	449.8	18	9	2065.5	28	9	4856.2
9	0	475.9	19	0	2120.9	29	0	4941.0
9	3	502.7	19	3	2177.1	29	3	5026.6
9	6	530.2	19	6	2234.0	29	6	5112.9
9	9	558.5	19	9	2291.7	29	9	5200.0
10	0	587.5	20	0	2350.1	30	0	5287.7
10	3	617.3	20	3	2409.2	30	3	5376.2
10	6	647.7	20	6	2469.1	30	6	5465.4
10	9	678.9	20	9	2529.6	30	9	5555.4

Weights and Measures Recognized by the Laws of the United States

Articles	Weight per Bushel, Pounds	Articles	Weight per Bushel, Pounds
Wheat	60	Buckwheat	48
Shelled corn	56	Dried peaches	33
Corn in ear	70	Dried apples	26
Rye	56	Onions	57
Oats	32	Salt	65
Barley	48	Stone coal	80
Irish potatoes	60	Malt	38
Sweet potatoes	55	Bran	20
White beans	60	Plastering hair	8
Castor beans	46	Turnips	55
Clover seed	60	Unslaked lime	30
Timothy seed	45	Corn meal	48
Flax seed	56	Fine salt	55
Hemp seed	44	Hungarian grass seed	50
Peas	60	Blue grass seed	44

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